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Manchukuo—A Study in Political and Economic Geography

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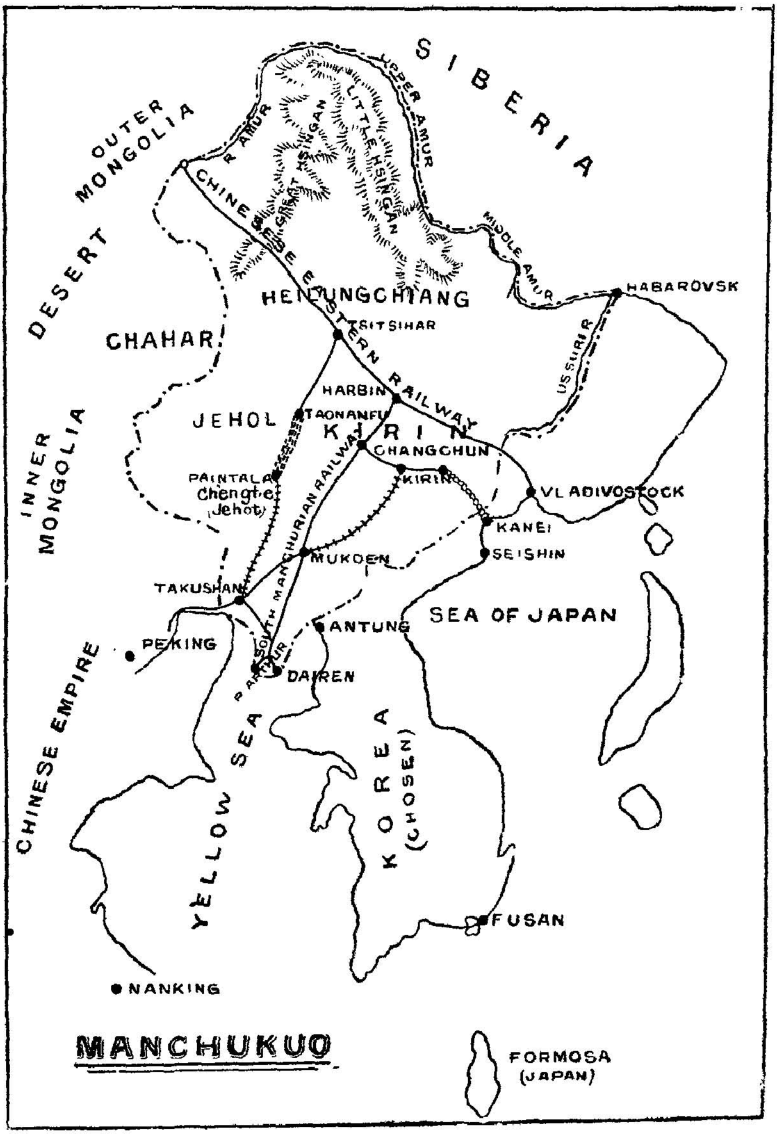
Of all the political and territorial changes that have taken place in the Far East during the last thirty years, the most important are the almost complete territorial disintegration of China, the proclamation of the Chinese Republic in 1912 after the expulsion of the Manchu Emperors, and the establishment of the new state of Manchukuo nominally independent but practically under the control of Japan. China, once the most extensive power in Central Asia with an area of 4¼ million square miles and with a population of about 475 millions has now practically, though not technically, lost the allegiance of most of her outlying parts, like Mongolia, Manchuria and Tibet and has come to mean at the present day only the country south of the Great Wall, with civil wars, flood, pestilence and famine adding to the miseries of her people. The long chain of events that has culminated in the establishment of the new state of Manchukuo in February 1932 under the aegis of Japan forms a very interesting study in political geography and affords a very good example of the influence exercised by geographical and economic factors in the political expansionism of nations.

Manchuria has long been the cradle of conflict in the Far East very much as the Netherlands were in Europe in the 17th and 18th Centuries. It has been the place where three great powers have been contending for supremacy *viz.*, Japan, China and Soviet Russia. Since the dawn of the 20th Century the struggle has become very acute and Manchuria is at present the area of the greatest tension in the Far East. To understand the present situation, a

brief survey of the historical incidents of the last 30 years appears necessary. As a result of the Sino-Japanese War of 1894-95, Japan obtained from China the Liao-tung Peninsula as the southern tip of Manchuria is called, but this roused the suspicions of Russia who induced Germany and France to join her in giving an ultimatum to Japan to give up this possession within 15 days. In the face of this superior combination, Japan was reluctantly compelled to yield and return the territory to China. At the same time, Japan felt that this was but a part of the Russian game to annex Manchuria herself. The Russian designs soon became more manifest so that Japan appealed to the other European powers to avert this catastrophe. Her appeals being of no avail, she was forced to declare War on Russia. This was the Russo-Japanese War of 1904-1905, which ended in the complete defeat of Russia and the emergence of Japan as a great Power in the East. The treaty of Portsmouth which concluded the War gave Japan possession of two valuable ports, Port Arthur and Dairen, besides valuable mining rights in the Liao-tung Peninsula and control of certain railways.

From this time onwards, Japanese Policy in Manchuria has been one of steady and peaceful penetration of the mainland of Manchuria with a view to obtain an economic and strategic grip of the whole region. As part of this policy, Japan built out of her own capital an important Railway line in the southern part of Manchuria known as the South Manchurian Railway. China not only consented to the construction of this line but also promised not to construct any parallel competitive lines to jeopardise Japanese interests. She also gave permission to Japan to take whatever steps she considered necessary to protect these lines against the attacks of the bandits who were a standing menace in the country. But she did not keep up to her promises. Actually about six hundred miles of parallel lines were built in contravention of the agreement with Japan, and in spite of repeated Japanese protest. Then followed the murder of a Japanese Captain of the Army by some robbers, the wholesale eviction of some Korean farmers settled in Manchuria, and the blowing up of certain tracts of the South Manchurian Railway by the Chinese soldiers in September 1931. Japan which had till now been putting up with all these provocative acts, was at last forced to intervene and we have the series of events ultimately ending with the establishment of the Manchukan State, in February 1932 under the life-dictatorship of Mr. Henry Pu-yi the exiled Manchu-Emperor of China. China protested to the League of Nations which, as the result of an elaborate enquiry by the Lytton Com-


SIBERIA
OUTER MONGOLIA
DESERT
R. AMUR
UPPER AMUR
GREAT HSINGAN
LITTLE HSINGAN
MIDDLE AMUR
HABAROVSK
CHINESE EASTERN RAILWAY
HEILUNGCHIANG
TSITSIHAR
CHAHAR
USSURI R
HARBIN
JEHOL
TAONANFU
KIRIN
CHANGCHUN
INNER MONGOLIA
PAINTALA
Chengte (Jehol)
KIRIN
VLADIVOSTOCK
KANEI
SOUTH MANCHURIAN RAILWAY
MUKDEN
SEISHIN
TAKUSHAN
SEA OF JAPAN
ANTUNG
PEKING
PORT ARTHUR
DAIREN
CHINESE EMPIRE
YELLOW SEA
KOREA (CHOSEN)
FUSAN
NANKING
MANCHUKUO
FORMOSA (JAPAN)

mission, wanted Japan to give up her control and refused to recognise the new state. Japan would not comply with the demand and at the present day except Soviet Russia and Japan, no other country in the world has recognised the new state. The new state has thus no international existence.

In discussing this question of the Sino-Japanese conflict in Manchuria, we shall see that geographical and economic factors have been largely responsible for the present political tension. The state of Manchukuo has an approximate area of 4,60,000 square miles with a population of about 34 millions and consists of four provinces, Jehol, Fengtein, Kirin and the province in the north abutting the river Amur known as Heilung Kiang. The country is surrounded practically on all sides by mountains sloping towards the east, and is watered by the Amur in the north, the Ussuri in the east the Yalu in the south and the Sungari in the west. Principally an agricultural country, her arable land is estimated at about 83 million acres or 28 per cent. of the whole area, situated mostly in the central Manchurian plain. The central city in this whole region is Habin. Millet, wheat, rice and Soya beans are the important agricultural products, whose supply is in fact so plentiful that Manchukuo may well be regarded as an agricultural paradise. The area under wheat cultivation is estimated to be about 40 million acres and Manchukuo promises to become one of the important wheat producing centres of the world. Soya beans are a valuable product grown in abundance in the central plains. Manchukuo almost enjoys a monopoly of this product. Bean oil is very valuable and is used for cooking, and for making margarine, soaps and candles. Bean cake is used as food by man and beast. Wheat flour is also prepared in plenty and is even exported. Besides, the mountains which are covered with thick forests contain very valuable timber which is usually floated down the rivers, and used for different purposes.

Mineral wealth is also equally abundant. Coal, lime stone, iron-ore and magnesite are available in large quantities. The coal mines at Fusan and Yantai are reported to be very rich, the annual output being on an average about 10 million tons i.e., 40 thousand tons a day. It is confidently expected that the output is likely to increase enormously with the adoption of improved scientific methods. Further, all these mines lie very close to iron-ore regions, at Anshun and are very useful in the production of pig-iron. Mining experts calculate that those iron mines contain at least one thousand five hundred million tons of iron and Japan hopes that,

in the course of a few years, it may not be necessary for her to depend on European markets for iron or coal. It appears also that very valuable bye-products have been obtained in working these mines. The Nitrogen obtained in converting the coal into coke is calculated to produce annually about 40,00,000 tons of ammonium sulphate which is supposed to be a very rich fertiliser, that can considerably increase the production of rice by about 15 mill. bushels. The lower strata of the Fusan coal mines are supposed to contain a kind of coal which can be converted into liquid fuel at a very small cost. Oil is obtained in great quantities and by special processes they have been able to secure as much as 85,000 tons of oil a year.

Central research laboratories have been established at various important centres to carry out research work in connection with the products obtained in the region and take further steps to industrialise the country. The laboratory at Dairen is very famous in the East. Being a virgin country, there is, no doubt, considerable scope for a good deal of agricultural and industrial development. The Manchurian central plain thus forms a very valuable hinterland and all the wealth of this region is fully tapped on account of the existence of several lines of railway and good ports open throughout the year.

Railway development in Manchuria has been very rapid during the last few years and there are now about 5,500 miles of open lines in Manchukuo. Railways in Manchukuo have, in fact, played a very important part in her economic development and are also likely to be of great value in the future as political and economic instruments. The most important of these viz., the Chinese Eastern Railway and the South Manchurian Railway are owned and controlled by the Japanese. Since 1928, however, the Chinese too have been very forward in railway construction. They now own a line from Peking to Mukden besides several other small lines in western Manchuria parallel to the south Manchurian Railway. The Chinese Eastern Railway is about 1,000 miles long and runs from North-West to South-East. It was under Russian control exclusively till 1920 but by an agreement of that year and another concluded in 1924 it passed under the joint control of China and Russia with a reservation that China could purchase it wholly at any time but only with Chinese capital. But China has not exercised this right and instead, Japan has purchased it from Russia outright. This railway taps the whole of the north Manchurian region.

The south Manchurian Railway, also Japanese owned, has a total length of 700 miles running due south from Hulan and Changchun to Dairen and Port Arthur with branches to Kirin, Antung and other places. It has also been connected with the Fusan coal-mines in Korea. Unlike similar companies, the South Manchurian Railway Company is not merely a railway concern; it operates coal iron and locomotive works, has wharves and warehouses on a large scale. maintains schools and looks after public health besides controlling a number of joint-stock companies, electric and gas works, shipping and dock yard repairs, etc. In point of the volume of trade transacted and the multiplicity of functions performed, this company stands foremost in the East and Pacific regions. Japan has invested about 1050 million yens in this undertaking. There are about 75 warehouses at Dairen alone while there are several more at other places intended for the storage and shipment of the bean-products of the region. It is intended also to extend this line to Kainei on the Korean border and Talai in Central Manchuria so as to give the forest and agricultural products of the Manchurian interior a new outlet to the sea at Seishin, also incidentally reducing the distance between Japan and Manchuria by a few hundred miles.

The strategic importance of this Railway cannot be exaggerated. It is an important section in the great railway system linking Europe and the Far East and it also enables Japan to keep an eye on Soviet activities on the Siberian and in North Manchurian borders. The Chinese too have not lagged behind in Railway construction. Though, against the provisions of the Treaty of Portsmouth, the Chinese have not hesitated to construct lines parallel to the South Manchurian railway and have under their control about 400 miles of open railways. They own a line from Peking to Mukden and propose to extend it to Kirin; and another line from Takushen to Paintala proposing again to extend it further north. Rather an amusing feature of the Chinese enterprise is that all their railways were built with money borrowed from Japanese Government. Between 1920 and 1927 when railway construction was very rapid in Manchuria, she borrowed as much as 150 million yen from the Japanese Government and has not returned even a cent towards principal or interest. What profits she made on these lines, she utilised in building parallel lines to embarass the Japanese system. It is said that the Chinese authorities went to the extent of compelling the natives to travel only on their lines. Had it not been for the great vigilance exercised by Japan and for the policy of retrenchment she adopted to meet the deficit, her whole

railway enterprise would have been easily ruined. As a result of this railway development, the population has more than doubled during the past 20 years. About 90% of the population are Chinese emigrants. The construction of parallel lines by China against the express conditions of the Treaty of Portsmouth has always been a source of friction between China and Japan.

Manchukuo is also well provided for in the matter of ports. The most important of them are Dairen, Port Arthur and Seishin, all of them open throughout the year under the influence of a warm sea-current, unlike Vladivostok which for the major part of the year is icebound. Port Arthur called also the Gibralter of the East is an important naval base and played a very prominent part in the Russo-Japanese war of 1904-05. Dairen is the real port and easily promises to become the most up-to-date constructed port in the Far East. Enclosing an area of 800 acres, it has a total length of 19,000 feet, and is capable of berthing steamers of a total tonnage of 400,000 tons. Special cranes have been provided for loading and unloading oil and any heavy cargo and there are as many as 8 miles of railway on the wharf. The port is also connected with Mukden, Harbin and Kirin in the interior. The development of this port was due entirely to the efforts of Japan which has invested as much as 60 million yen in the work.

Such is the economic position of the new Manchurian state. The importance of such a virgin country with tremendous possibilities of development to a country like Japan considerably over-populated badly deficient in food supplies and raw materials, cannot be exaggerated. Only one-sixth of her total area of 1,76,000 square miles is cultivated and in a small country, only a little larger than California, about 62 millions of people are huddled together. The climatic and political conditions of the country are not satisfactory. The north is too cold and the south too mountainous while the whole island, being of a volcanic origin, is constantly exposed to the wrath of nature, such as earthquakes, volcanic outbursts, etc. Again ever since she became industrialised, she has had to import food, coal, iron and oil. It is also to be noted that Japan which has sent out her sons as colonisers and settlers to other lands desires to keep them contented and under her own flag by providing them with land and with business opportunities. Manchuria and Mongolia are lands with plenty of pastures and mineral wealth. They can supply Japan with all the wool and meat she needs. To her, any retreat from the struggle in Manchuria is a matter of life or death. Apart from the fact that she may have to

face an economic crisis of the first magnitude, it means in terms of money the loss of an investment of about 2,000 million yen. It also means the surrender of 3,00,000 Japanese and 1 million Korean subjects of Japan to the tender mercies of China, while they demand Japanese protection. Japan wants a place to dump her surplus population. "We want the western nations to understand that we are over-populated"—said a Japanese Peer of note. Formosa, Korea and her own islands are too poor to produce enough for their own needs. Again ever since she began a policy of industrialisation, she has been badly wanting coal, iron and oil. Manchukuo offers her a vast field for colonisation, settlement and economic development for the satisfaction of her needs. It is not surprising that, under the circumstances Manchuria, has become a storm-centre and the scene of fight between China, Japan and Russia under cover of a policy of " open door." To Japan therefore the preservation of the Manchukuo state is a very vital question.

So far as China is concerned, it is not so much an economic question as a political question. Economically, China has not probably lost very much. It will be idle to pretend that there has been no loss in her imports and exports but one circumstance must not be ignored and that is the fact that the bulk of Manchurian trade is still in the hands of the Chinese. To the Chinese, again, Manchuria has become a haven of refuge from their famine and flood ridden country, torn by internal wars. It is impossible otherwise to account for the large importation of the Chinese into Manchukuo. Also, Japanese control of Manchuria and her schemes of economic development have been enormously beneficial to the natives. Manchuria's trade, has increased 20 times in the years between 1907-1930. The economic losses are therefore not of vital importance. The political consequences of the creation of the new state are, however, more vital. So long as Manchuria was in the hands of the Chinese, China could boast of a natural and fairly stable frontier in the north by the Amur river, and Manchuria served as a buffer between Russia and China. But the loss of Manchuria has brought the frontier dangerously near the Chinese territory, as the new frontier will run along the line of the great wall. The consequence of this will be that, whichever power is in possession of the passes, that power will hold the key to North China and will be enabled to interfere in the internal politics of China. That is by no means satisfactory at the present time. Further, another dangerous feature of the new frontier is that at its eastern extremity lie regions of great mineral wealth, rich deposits of coal

and iron. The coal mines worked by the Kailan Mining company are only about 90 miles distant from Shangaikwan close to the great wall. The existence of these rich sources of mineral wealth in such close proximity to an international frontier are bound to cause friction and are a standing menace to the peace of the countries on the border. What are Manchukuo's frontiers in the west? That is a question impossible to answer. An international state must have obviously definite frontiers, natural or otherwise. But in the case of Manchukuo there appears to be no frontier in the west and one is at a loss to know where Manchukuo's aggression will stop under Japanese influence. The ultimate goal appears to be the absorption of the whole of Inner Mongolia. Anyway, it cannot be denied that the existence of a state without any international recognition and without any frontiers is a fact, the dangerous effects of which on the far Eastern Nations, it is difficult to foresee.

The Manchukuan question should not be considered as merely an affair between China and Japan. It has got certain international aspects also. Then are the important questions of the balance of power in the Pacific, the American-Japanese relations the Russo-Japanese relations etc. Japanese expansionism though largely the outcome of her own economic difficulties, threatens also to disturb the balance of power in the Pacific. Japanese leaders do not disguise the fact of their belief in their mission of dominating the far East. Formosa and Korea have already been annexed. Manchukuo has come under their influence. They would probably desire China and Inner-Mongolia also to pass under their political control so that they could be the masters of Eastern Asia and be ultimately recognised as the natural leaders of the Asiatic peoples, nay, of all the coloured races, against European imperialism. Even as late as April 1934, Japan proclaimed a Munroe Doctrine for the Far East and wanted the powers to keep their hands off China. A prominent member of the Japanese House of Peers and president of the Imperial Educational Society of Japan gave expression to much the same sentiments. He said " It is very unpleasant for us to see articles and hear of war between the United States and Japan. We will not meddle with the immigration law in America, since it is her own problem. Therefore we wish Americans not to interfere with problems of the Far East which have no direct relation with America. If we understand the situation in both countries, the relationship between the two countries will always be peaceful.' Even in the matter of the present struggle between Italy and Ethiopia, it is reported that the Italian press is " accusing the Japanese of at-

tempting to assume a leadership of all the coloured races in addition to their present position as leader of the yellow race, and to expand their commercial influence in East Africa at the expense of Italy." Two facts are clear from a study of Japanese policy in the East in recent years. One is her determination to establish her hegemony in Asia and the other is her envisaging opposition from America and the European powers because her Asiatic hegemony will affect the balance of power in the Pacific. "The Singapore naval base is the outward and visible sign of Great Britain's determination to defend the Indian Ocean and the East Indian Islands against Japanese political penetration." Britain has thus safeguarded her position in the East.

The other powers are not very much concerned as they are not affected to any great extent. China appealed to the League of Nations against Japanese aggression but except for pious expressions of sympathy and the appointment of the Lytton Commission, nothing was done. A possible cause of the indifference of the League is the feeling that however much Japan may desire Asiatic hegemony and may be determined to achieve it, China and Russia "are rather tough morsels to assimilate" and that it will not be an easy job to swallow China. It is too vast a country to be easily overrun.

Russia is not too anxious to press for strong action at the present moment though recent reports point to several skirmishes on the Manchukuan borders. Partly, she wants to complete her own scheme of internal economic development and political consolidation; partly also, she has amply provided for the defence of her Far Eastern territories under any emergency. She has got a strong 'air-craft base' at Vladivostock and is confident that she will be able to repel any attacks on that side.

It is not also rash to hazard that Russia is now practically giving up her contest in Manchuria. She is now looking forward to expansion in outer-Mongolia which has already become communist under her influence. It will be a natural desire for her to make that the centre of her influence and thus establish contact with the growing body of communists in China. The recent action of Russia in selling away the Chinese Eastern Railway to Japan is a sufficient indication of her growing desire to give up the contest in Manchukuo.

So far as the United States is concerned, she is undoubtedly a party whose interests in the Pacific are likely to be affected. But

she cannot assert herself without the co-operation of the European powers who are now too busy at home with their own internal problems to turn to affairs in the East. Further, Japan also on her part is proceeding by careful stages so as not to develop a crisis and realises the need for consolidation of her present position before further advance. Nor has she yet challenged the policy of 'Open door' in Manchukuo, so that the position of the European powers in China and Manchuria is not affected.

Again, can the European powers resort to strong action without the co-operation of Soviet Russia? The results of the intervention with Soviet help are ultimately bound to be disastrous. For Russia and Japan are undoubtedly the two rival claimants for the allegiance of the East and whatever may be the present position, the struggle in the Far East is, in the long run, bound to be only between these two powers for the ultimate control of China. The victory of Russia is the victory of communism and a Soviet China linked with Soviet Russia will be a standing menace to the peace of the East and to the peace of the world. China too for the same fear of communism will be prepared for a policy of accommodation with Japan rather than with Russia. "The Japanese, on the other hand, only carry to its logical extreme the imperialist policy which the western nations have constantly practised themselves" in their turn so far as the East is concerned. These circumstances explain, to some extent, the general apathy of the western nations at the present time to the developments in the Far East.

It is neither safe nor desirable to prophesy in international politics, but there is no question that, beneath the calm that appears to pervade the Far East for the moment, there are smouldering fires which may burst forth into a conflagration and bring about a violent contest for supremacy in the Far East in the not distant future. The sooner the European powers and America tackle the question of the status of the Manchukuan state, and the sooner they collaborate to set matters right in Mongolia and China, the safer it will be for the peace of the world.

*The more important " Minor Forest Produce " of the Madras Presidency

By

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Forest produce is technically divided into two main classes: "Major Forest Produce" comprising timber and firewood, and "Minor Forest Produce" the rest. The latter consists of a great variety of articles, chief among which are: Tans and dyes, gums, oleo-resins. drugs, spices, grasses, fibres and flosses, oil-seeds, rubber, minerals, and animal products such as lac, silk, honey, wax, hides, horns, ivory etc.

The collection of such produce is restricted to those kinds which it pays to collect, and the right of collection is generally leased to contractors, except in certain localities like Sriharikota in Nellore district, and the Nilgiris, where the produce is collected departmentally to afford employment to the local hill-tribes. Appendix A gives a list of the more important kinds of produce of this presidency. and the prices that ruled in a particular month, in the markets specified. As the prices fluctuate, such quotations are obtained monthly and circulated (to the officers of the forest department and to the Director of Industries, Madras)

During recent years, there has been an opening up of our forests with a greater net-work of roads to facilitate exploitation of the produce, and it is hoped that ere long, with still greater facilities in this direction, it would be possible to achieve a fuller utilization, and a more intensive working. The Forester's erst-while slogan, (*a*) "Woodman, spare that tree," (*b*) will run, "Use all the tree, and grow more!" We hear so much now-a-days about diversified farming as a solution for the farmer's ills. Diversified utilization of the forest products would also go a long way in making forestry more profitable. It is only when every part of every tree is put to its best use that forestry becomes a truly profitable concern.

* A paper read before the Coimbatore Branch of the Association.

To gain this ideal, we must more extensively exploit our resources, and bring to an irreducable minimum all possible sources of wastage in collection, conversion, transport, etc. An avoidance of wastage in collection in the case of the 'Major produce' is intricately bound up with the question of improved methods of extraction and transport *. In regard to "Minor Produce" in particular, wastage results not merely from faulty methods of collection, but by our failure to exploit all potential sources of produce in our forests. An instance is furnished by the pseudo-gum exuded from the tree *Sterculia urens*. This produce was, till recently not systematically collected in many parts of India, owing to our ignorance of its properties and value. Its collection in 1932-33 in the Central Provinces alone, fetched a revenue of no less than Rs. 9,000 with prospects of a further increase in the future! Revenue from such sources was locked up till recently, owing to an insufficient knowledge of our assets.

True, in America and elsewhere there is a fuller utilization by invoking the aid of the latest discoveries of science. Saw-dust is converted into 'sacchulose' useful for the distiller and the agriculturist. Wood-chips are exploded into millions of fibres and converted into "synthetic lumber." Wood-cellulose is made to yield artificial silk. Recently a new packing material has come forward in the form of wood-fibre blanketing or matting, from waste lumber. Transparent sheets of cellulose are now being used for making laminated "glass" which is bullet-proof. Chemists hope to get glucose from wood, and very soon our breakfast will consist of material got from pieces of wood! But one must not be over-optimistic in the case of a country like India, where the conditions are very different, and do not yet warrant the adoption of such mechanical or scientific methods in forestry. Great caution has to be exercised in starting forest industries in particular. For instance, the production of "power alcohol" from Indian softwood was claimed to be possible and to prove a paying industry in India; but a re-

* For South Indian conditions, however, experiments have shown that, after all, dragging by elephants and transport by bullock-carts are the cheapest and best suited; but the introduction and extensive use of the Indian bullock-cart modernised by the Dunlop Rubber Co. (India) Ltd. who have recently produced special pneumatic rubber tyres and roller bearing hubs, are worth a trial. It is claimed that with such an equipment, as much as 100% greater loads can be carried with less tractive effort, besides resulting in considerable savings in road-repairs that could be utilised for opening up of our forests by more roads.

cent note on this by the Imperial Forest Economist gives us a rude shock, and proves that the profitable manufacture of power alcohol from India's forests is no more than a golden dream!

Before we review the items of the minor forest produce, it would be well to know some statistics on the revenue from them. Out of a total revenue of Rs. 39.43 lakhs for 1933-34, minor forest produce fetched Rs. 5,54,703, as against Rs. 5,67,473 in 1932-33. The decrease in revenue occurred mainly in the Kurnool district, due to want of demand for slab quarries, "tangedu" (*Cassia auriculata*) and "Rela" (*Cassia fistula*) barks, and to a fall in tree tapping fees. In 1932-33, in Anantapur district alone there was a fall of Rs. 4,784 in the lease amount for "tangedu" bark. "Tumki" (*Diospyros melanoxylon*) leaves—for "beedies" fetched about Rs. 4,000 in Upper Godaveri Division. In July 1933, 400 candies of Nux-vomica seeds were sold by the Department @ Rs. 10/- per candy, and 300 candies of last year's collection were auctioned for Rs. 11–4–0 per candy.

We will next briefly consider the very important items of the minor forest produce of this Presidency:

I *Grass*:

This constitutes an important factor in maintaining the agricultural prosperity of any country, particularly of India. Of recent years, attempts made in the Ootacamund circle to introduce on a large scale better species like "Kolukattai" (*Pennisetum cenchroides*) and "Kikyu" (*Pennisetum clandestinum*) grasses, met varying degrees of success. The 'Kolukattai' gave better results. The artificial introduction of better species of grass with a view to improvement of forest grazing in this presidency is, perhaps, never likely to be a paying proposition.

The Lemon grass oil of commerce, used in perfumery and as an antidote for mosquito bites, is yielded by *cymbopogon citratus*. The roots of 'Khus-Khus' grass (*cymbopogon muricatus*) yield also a fragrant oil.

II *Manure leaves*:

The removal of leaves for manure is allowed in places where people are unable to do without them. It has been the recognised policy of Government gradually to wean the ryots from the habit of depending on the forests for this supply, and to encourage them to grow their requirements on their own lands, or to use other kinds of manure. In a certain year, in two ranges in the Madura

district, there was a demand for no less than 43,000 cart-loads of manure leaves!

III *Fibres and flosses:*

Fibres of value are yielded by the inner-bark of certain woody species, and by certain parts of some fruits, and leaves. The chief fibre-yielding woody plants hail from the families *Malvaceae, Sterculiaceae, Tiliaceae, Leguminoseae, Asclepiadaceae,* and *Urticaceae. Sterculia villosa* yields fibre used for elephant-dragging ropes. The fruits of *Eriodendron pentandrum,* Kurz, yield the true 'Kapok' floss, while those of *Cochlospermum,* and *Bombax* yield substitutes of somewhat inferior quality. The petioles of the leaves of *Caryota urens* give the *Kitul* fibre. Leaves of Agave, and *Furcraea gigantea* also yield strong fibre.

IV. *Oil seeds:*

Oils of economic importance are furnished by seeds of certain species of forest trees. *Bassia latifolia, B. Longifolia* and *Sal* yield oil useful for cooking and burning. "Kokam butter" is got from *Garcinia indica.* Oil of medicinal value is yielded by *Pongamia* glabra and the Neem tree. Though the seeds of the Burmese tree *Taraktogenos kurzii* form the source of the true "chaulmugra oil" used for leprosy and skin diseases, those of the South Indian tree *Hydnocarpus wightiana* are largely in use for bad skin diseases. Seeds of *Givotia rottleriformis* yield an oil suitable for lubricating fine machinery, and of *Vateria indica,* a butter known as 'Piney-tallow, useful for making inferior candles. (*Myristica canarica* also yields a similar fat.) 'Oleum nigrum' is yielded by *celastrus paniculata.*

V. *Tans and dyes:* (*a*) *Tans:*

Tannin is an organic substance having the property of combining with albumin and gelatine to form an insoluble compound capable of resisting decay. Raw hides treated with tannin, thus get converted into leather. Its other property of giving a black reaction with iron salts is made use of in the manufacture of ink. It occurs chiefly in barks (the inner part), certain fruits and leaves, and in the galls formed on leaves and stems by insects.

The most extensively used indigenous tanning barks in this presidency are those of *Cassia auriculata, Cassia fistula, Acacia arabica,* and certain mangroves. Due to an increase in the imports

of South African Wattle * bark at cheap rates, and a general depression in the tanned hides market, there has been a considerable fall in the price of the indigenous tan barks.

The heartwood of *Acacia catechu* and of *A. sundra*, yields the "Cutch" of commerce. The leaves of *Anogeissus latifolia* ("Sumach"), and *Emblica officinalis* are rich in tannin.

Among the principal tan fruits are the (chebulic) myrabolans, which form next to 'sumarch' the most important pyrogallol tan of India. Out of the average annual export of about 75,000 tons of the tanstuffs of India, the myrabolans alone form 80%

(b) *Dyes* :

The use of indigenous stuff for dyeing in India is dying, due to severe competition by synthetic products and imports. "Kamela" (the red powder got from the glands on the fruits of *Mallotus philippinensis*) was a regular source of revenue in the Ganjam district upto about 1898, but the revenue became fitful thereafter. Samples sent in 1900 to Germany were favourably reported on but, in the face of synthetic dyes the prospect of trade in this and similar Indian dyes became gloomy and unpromising.

Dyes are yielded from certain barks (the outer part), wood, roots, leaves, flowers, fruits and seeds. Many tanning barks and wood-extracts are also used for dyeing.

The chief *bark* dyes are: *Acacia arabica*, *Terminalia tomentosa*, *Harduickia binala*, and *Morinda tinctoria*. The wood of Red Sanders (*Pterocarpus santalinus*) yields a salmon-pink dye ("santalin"); of * *Caesalpinia sappan* and *Adenanthera pavonina* a red dye; of Jack, and *Berberis* spp. a yellow dye. The *leaves* of *Terminalia catappa*, *Wrightia tinctoria*, and *Lawsonia inermis* are dyeing agents. "Litmus" dye is got from lichens. Among dye flowers may be mentioned the Pomegranate, *Cedrela toona*, *Butea frondosa*, *Wrightia tinctoria*. The pulp round the *seeds* of *Bixa orellana* gives the "Arnatoo dye" and the red glands around the fruits of *Mallotus* the "Kamela dye".

VI. *Perfumes* :

Perfumes are yielded by the flowers of *Michelia champaca*, *Jasminium* spp., *Gaultheria fragrantissima*, *Mimusops elengi* etc.

* Acacia decurrens, *var.* mollisima, giving about 30% tannin.

* The wood of this and the leaves of Memecylon edule are used in Malabar for dyeing reed mats.

VII. *Exudations from trees* :

These are technically classified as under :—

A. *Gums* :

- (*a*) *True gums* :
  - (i) Arabic kind (*Acacia arabica*)
  - (ii) Cherry „ (*Prunus cerasus*)
- (*b*) *Pseudo-gums* :
  - (i) Tragacanth kind (*Sterculia urens*)
  - (ii) Dark or Moringa (*Moringa oleifera*)
- (c) Astringent gums (*Pterocarpus marsupium*)

B. *Gum-resins* :

- (*a*) Emulsive (Gamboge)
- (*b*) Foetid (Asafoetida)
- (*c*) Fragrant (Googul)

C. *Resins* :

- (*a*) Pale (*Vateria indica*).
- (*b*) Dark (Black dammar).

D. *Oleo-resins* :

- (*a*) Balsams (Wood oil)
- (*b*) Varnishes.
- (c) Turpentine and tar.

The more important under the above sub-divisions are :

A. *True gums* : *Acacia arabica* (Babul),
Ægle marmelos (Bael),
Azadirachta indica (Neem),
Anogeissus latifolia,
Odina wodier.

B. *Pseudo-gums* :
Cochlospermum gossypium,
Sterculia urens,
Bombax malabaricum (Red Silk-cotton tree)
Pterocarpus marsupium (Kino)
Butea frondosa (" Bengal kino ")

C. *True resins* :
Vateria indica (Indian Copal)

Shorea robusta (Sal)
S. tumbuggaiya
Canarium strictum (Black dammar)
Ailanthus malabaricum ("Maddippal")

D. *Oleo-resins* :

* *Hardwickia pinnate* (Malabar mahogany.
Dipterocapus indicus (Wood oil tree of Malabar).

VIII. *Rubber* :

"Para-rubber" is yielded by *Hevea braziliensis* which is planted on a large scale, in certain parts of the presidency.

IX. *Drugs, spices,* etc. :

Medicinal *barks* : *Soymida febrifuga,*
Cinnamomum Zeylanicum,
Holarrhaena antidysenterica,
Careya arborea.

" *leaves* : *Cassia augustifolia* (Tinnevelly senna),
Cassia alata,
Neem.

" *fruits & seeds* : * *Strychnos nux-vomica,*
Caesalpinia bonduc,
Cassia fistula,
Ægle marmelos,
Abrus precatorius,
Cardamoms.

X. *Edible products* :

Fruits : Jujube, Cashew-nut, Bael, *Emblica officinalis, Spondias mangifera* (Hog-plum), *Carissa carandas, Ficus* spp.,

* Tapped in South Kanara and Tinnevelly districts. A tree yields from 6 to 24 gallons of oil ; locally used as a wood preservative ; Rs. 12 to Rs. 14 per four gallons, in South Kanara. It is believed that trees can be tapped at intervals of about ten years.

* The seeds of *Strychnos nux-vomica* are an important item of minor Forest Produce in this presidency. The Nellore seeds are said to be superior to those of the West Coast.

Sazygium jambolanum (Black plum) ; *Seeds*: of * Bamboos ; *Flowers* of *Bassia* ; *Sap* from the *Palms Phoenix, Caryota,* etc. Certain fungi and lichens are also edible.

XI. *Animal Products*: (*a*) *Lac*:

This is a resinous incrustation on the twigs of various trees, produced by a minute insect. It is used in the manufacture of gramophone records, varnishes, sealing wax, lacquer work, etc.

Of all the minor forest produce, the demand for lac and lac products has been, of recent years, extremely unstable, due especially to serious competition by nitro-cellulose and other synthetic substitutes.

A lac research institute has been founded at Ranchi, in North India, to conduct research in the natural product, and a special officer has been appointed in London to investigate and stimulate the demands for lac and shellac. In the Madras Presidency, for some years, lac cultivation was being done on a large scale in North Salem, Madura, North Coimbatore and Palghat Divisions, but owing to the depression in the lac market, lac operations are, at present, very restricted, and it has been found profitable to convert the lac into sealing wax and wood-polish, and offer these for sale. Last year, the jail department purchased (from the Forest department) its requirements of shellac for making superior sealing wax, and the Inspector-General of Prisons has agreed to purchase, for all the jails, their requirements of wood-polish, from the Forest Department, the stuff having been found to be as good as any imported one.

(*b*) *Honey and wax*:

Honey is collected from flowers and stored in combs, by different species of bees particularly where large trees and rocks abound. It is separated from the wax by letting it drip out of its own accord through a sieve, or by squeezing it out through a cloth. Where bees are artificially reared it is extracted by a centrifugal machine which leaves the empty comb intact, and saves the bees the trouble of making new combs.

Bees-wax is got by placing the empty combs in boiling water, the wax melting and floating to the surface whence it is skimmed.

* The simultaneous flowering (followed by the setting of seeds) of certain species of Bamboo over large areas in 1896 considerably alleviated the severity of the famine that occurred that year, in India.

(c) *Hides, Horns, Bones, Ivory*, etc :

XII. *Mineral Products* :

[Such as mica from Nellore, barytes (barium sulphate) from Anantapur, manganese from South Cuddapah.]

Appendix A gives a list of the more important items of minor forest produce, and the prices that ruled in a particular month in the markets noted against them.

In Appendix B is given a list of the forest divisions, with the chief minor produce extracted in each.

APPENDIX A.

Quotations for Minor Forest Produce during November 1934.

Name of produce.	Quality.	Rate in Rs.	Unit.	Name of market.
1. *Cassia auriculata* (Bark)	I.	18 to 19	500 lbs.	Madras.
English : Tanner' Cassia.	II.	14 to 16	„	„
Tamil : Āvāram.	I.	19 to 20	„	Trichinopoly.
Telugu : Tangedu.	II.	16 to 17	„	„
Hindustani : Tarwar.	II.	9 0 0	„	Rajamundry.
	I.	10 0 0	„	Vellore.
	II.	8 0 0	„	„
	I.	22 0 0	560 lbs.	Coimbatore.
	II.	20 0 0	„	„
2. *Cassia fistula* (Bark).		10 to 11	500 lbs.	Madras.
Tamil : Konrai.				
Telugu : Rela.	I.	9 0 0	„	Vellore.
Kan. : *Kakke.*				
Hind. : *Amaltas.*				
3. *Wattle bark*				
(*Acacia* spp.)		90 to 95	Ton	Madras.
4. Myrabolams (Fruits).	I.	25 to 30	500 lbs.	Madras.
Fruits of *Terminalia chebula*,—the gall nut		25 to 27	„	Trichinopoly.
tree.	I.	6 to 7	„	Atur.
Tamil & Mal. : *Kadukkai.*				
Telugu : *Karaka.*	I.	7 to 7½	„	Shevroys.
Kan. : *Heerda.*	I.	18 to 20	„	Calicut.
Hind. : *Harra.*	I.	25	560 lbs.	Coimbatore.
5. Nux-vomica (Seeds).		9 to 10	500 lbs.	Madras.
(*Strychnos nux-vomica*).		13 8 0	„	Rajahmundry.
		8 to 10	„	Vellore.
6. "Seekai".	I.	38 to 39	„	Madras.
(*Acacia concinna pods*).	I.	15	„	Rajahmundry.

Name of produce.	Quality.	Rate in Rs.	Unit.	Name of market.
7. Soapnuts.	I.	24	„	Madras.
(fruits of *Sapindus*		50	800 mrs.	Rajahmundry.
emarginatus).		15 to 20	500 lbs.	Vellore.
8. Tamarind, shelled and seeded.	I.	22	500 lbs.	Madras.
	II.	18 to 29	„	„
		18	„	Rajahmundry.
		14	„	Vellore.
9. Bees' Wax.		200	„	Madras.
		180	„	Rajahmundry.
		130 to 140	„	Vellore.
		225 to 240	„	Calicut.
		230	„	Coimbatore.
10. Dammar.		40 to 45	„	Calicut.
11. Deer horns.		55	„	Rajahmundry.
12. Sambhur horns.		50	„	„
13. Divi-divi.		9	„	Madras.
(Pods of *Caesalpinia coriaria*).		10	„	Vellore.
14. Cardamoms.		620	„	Madras.
		560	„	„
		330 to 335	„	Calicut.
		375 to 500	„	Coimbatore.
15. Nutmeg.		220	„	Madras.
16. *Beedi* leaves (Nagpur)		40	1000 bundles.	„
(*Diospyros melanoxylon*) Hyderabad	I.	27½	„	„
„	II.	15	„	„
17. Charcoal				
(Krishnagiri).		0 15 0	Bag.	„
(Kalahasti).		0 14 0	„	„
18. Ivory.		4 to 6	1 lb.	Calicut.
19. Grain lac		41	Bengal maund.	Calcutta.
20. Pepper		130	500 lbs.	Madras.
21. Honey.		125 to 140	„	Calicut.
		90	„	Madras.
		70	„	Rajahmundry.
		9	Tin.	Coimbatore.

APPENDIX B.

List of Forest Divisions and the chief minor produce in each.

Waltair circle :

Ganjam	.. Bark of *Cassia fistula* (Rela); Kutch (*Acacia catechu*); Kamela powder, etc.
Vizagapatam	.. Bark of *Cassia auriculata* (Tangedu).
Godavari (Upper)	.. Leaves of *Diospyros melanoxylon* (*Tumki*); Tangedu, Sheekai, Tamarind, honey, horns, etc.
„ (Lower)	.. Seeds of *Strychnos nux vomica* (Nux-vomica). Bark of 'Tangedu' and 'Rela'. Fodder grass, bamboos, etc.
Nellore	.. Nux-vomica.
Guntur	.. Fodder grass.
Parlakimedi	.. Kamela powder.

Bellary circle :

Kurnool (East)	.. Nux-vomica; Tumki & Platter leaves (*Butea frondosa*).
„ (South)	.. Tumki and Platter leaves; Tangedu and Rela barks.
„ (West)	.. Nux-vomica; slab quarries.
Anantapur	.. Tangedu bark; Tumki and Platter leaves; barytes (barium sulphate—from Ganganapalle).
Cuddapah (North)	.. Tumki leaves; Tangedu and Rela barks.
„ (South)	.. Tumki leaves, bamboos, manganese—from Balapalle.

Salem circle :

Vellore (East)	.. "Divi-divi" pods. (*Caesalpinia coriaria*); Soap-nuts, etc.
Salem (North)	.. Lac, gall-nuts, 'Vembadam' bark (*Ventilago maderaspatana*), charcoal.
Salem (Central and South)	.. Gall nuts, Vembadam bark, Charcoal, Tangedu and Rela barks.

Coimbatore circle :

Madura	.. Lac; 'Kasan' leaves (*Memecylon edule*).
Tinnevelly	.. Oleo-resin from *Hardwickia pinnata*, Cloves, Cardamoms, Reeds for mat-making.
Kollegal	.. Sambhur and Deer horns.

Coimbatore (North)	.. Bamboos ; sambhur and deer horns, honey, wax, gall-nuts ; lac.
„ (South	.. Sambhur horns, ivory, Cardamoms, gall-nuts, wax, 'Sheekay', honey, resin from *Ailanthus malabarica.*
Ootacamund circle :	
Mangalore	.. Cutch (from *Acacia sundra*), oleo-resin from *Hardwickia pinnata,* seeds of *Myristica canarica.*
Wynaad	.. 'Kino' from *Pterocarpus marsupium.*
The Nilgiris	.. Eucalyptus oil, honey, wax, horns, charcoal, fodder grass.
Palghat	.. 'Sheekai', lac, 'Usilam' (Leaves of *Albizzia amara*), cardamoms, pepper, dammer, seeds of *Hydnocarpus wightiana.*

Teaching of Geography in Training Schools.

By

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Why should we enquire into the present position of geography in Training Institutions ? What is the bearing of the teaching of Geography here on the general problem of the education of the pupils in Secondary and Elementary Schools ?

Let me begin the answer to these two pertinent questions by a reference to a few facts concerning Geography teaching in our Presidency. Even the most superficial of observers of educational changes in our Province will readily concede that no other subject of the school curriculum has undergone such Kaleidoscopic changes as Geography during the last quarter of a century or so. In 1911 it was relegated to the B group subjects along with History and Elementary Science where it hybernated for nearly twenty years. In the year 1930-1931 the neglect of the study of the subject was recognised by the authorities concerned 'as an outstanding defect of the S.S.L.C. scheme * and in what is called the 1929 scheme Geography became a compulsory subject. A fresh impetus was given to the subject by the Madras University instituting a Diploma course in Geography in 1932-1933 with a view to supply a sufficient number of teachers qualified to teach the subject in the Secondary Schools and in the Intermediate classes. But this sunny weather was shortlived as another revision of the S. S. L. C. scheme was ushered in 1934, one of the effects of which would be to make the high school region too hot for Geography. Geographical instruction, under this scheme, which is now kept in abeyance, stops at the end of the IV Form course practically, for the 'C' group Geograpy will only exist on the printed pages containing the revised S. S. L. C. scheme.

Enthusiasts in the subject are therefore trying to make the best of a bad bargain by concentrating their attention on the teach-

* Report on Public Instruction for the quinquenniem, 1927-28 to 1931-32, Page 75.

ing of Geography in the lower forms of Secondary Schools. As a result a new syllabus for the Middle Schools is being framed by a Committee of Experts with a view to make this branch of study attractive and useful. The syllabus has to be worked out by teachers and however up-to-date and perfect the former may be, unless the teacher is qualified to handle the subject, the efforts of the committee will not bear much fruit.

What then are the general and professional qualifications of those teachers who are now entrusted with the work of Geography teaching in Secondary Schools. There are about 530 Secondary Schools in the Presidency with about 2800 graduates and 4000 secondary grade teachers on the staff. It may be safely asserted that in most of the 366 High Schools not to speak of the 164 Middle Schools Geography teaching will be entrusted to the secondary grade eachers. If it be argued that in course of time these teachers will be pushed down into Elementary Schools by the ever increasing army of the unemployed graduates it may be pointed out that these latter will in no way be better than the former so far as Geography teaching in the Middle Schools is concerned. Only a very small percentage of these L.T's. would, in the normal course of events, have received a special training for Geography teaching and that too in the short space of nine months when they learn both the subject matter and the method. On the other hand, now that the Government have finally decided to retain the two year course of training for the S. S. L. C.'s., it is relatively easy to equip these with a sound knowledge of Modern Geography and the right method of teaching the same up to the third form.

Therefore the efficiency of Geography teaching in Secondary Schools ultimately depends on the staff in the Training Schools . Hence one of them atleast may be deliberately chosen and trained for this purpose by the department. This specialist in Geography will have atleast 10 to 12 periods of work in a week in Geography alone. At present the employment of non-specialist staff in some of the Training Schools, on the ground that the students are trained to become efficient class masters, is already vitiating the system of training. It is not a rare thing to find three History graduates or three Mathematics graduates working in one school and unless and until each school is provided with a specialist in each of the following subjects like Mathematics, Science, History or Geography, Geography teaching in Training schools and consequently in the Elementary and the Middle Schools is bound to continue to be as inefficient as it is to-day. From my twelve year's

experience of Geography teaching in the junior class consisting mostly if not exclusively of the S.S.L.C. eligibles, I can say without exaggeration that every year I had to start from the zero longitude of Geographical knowledge on the part of the fresh men, all of whom had studied Geography in the High School. So long as the conduct, inspection and examination or our schools continue to be in the hands of people who have themselves been trained in either the Arts or the Science side, Geography will be looked upon as an interloper—a subject which has obvious links with both but which could not be identified with either. This double face of the subject, which is its greatest merit, has been mainly responsible for its low position in Secondary Schools. The only effective remedy is the provision of a sufficient number of teachers who have received a good training in Modern Geography and are imbued with a faith in the unique educative value of the same. But what do we actually find in the Training Schools? On account of retrenchment one L.T. has been removed from the staff of every Training School with the net result that Geography teaching is entrusted, in most Schools to the Secondary Grade Assistants whose knowledge of Modern Geography is rather poor.

Atleast, if the text books prescribed are of the right type and are calculated to give these teachers a clear idea of the fundamentals of Geography it will be something; but many of the books in the field, especially those that are written in the Vernacular, present a kind of novel Geography original in many respects. New theories, Astronomical and Physical, have been propounded by these authors. Let me cite only a few of these absurd statements taken at random mostly from some of the existing Vernacular* books on Geography. (1) "Every new moon day, the Sun comes in between the Earth and the Moon," (2) "All observers on the same Meridian will have simultaneous sunrise, sunset and noon." (3) "Table lands are produced either by earthquakes or the flow of lava from Volcanoes." (4) "The courses of all rivers can be divided into three stages, viz., the Mountain or Hill tract, Middle or Plain tract and the Deltaic tract." (5) "There is one thermometer called wet and dry bulb thermometer with a single reading." (6) "The axis of the earth is inclined at 23½° to the ecliptic." (7) "There are ocean currents to be met with in all parts of all oceans and at all times. (8) "At midday the Sun comes overhead at all places." (9) "On the 21st of June the Sun comes opposite the North

* These are English translationr of the sentences in Tamil.

Pole." (10) "If an object travels with the speed of wind and mind (வாயுவேக மனோவேகமாய்) it will complete its journey in 50 years." One can picture from a study of the statements quoted above the kind of geographical knowledge that is probably passed on by the teachers in Training Schools to their pupils who, in their turn, spread it to their pupils found all over South India. This 'newer' Geography is just the opposite of that portrayed by Dr. Mill through his pyramidal concept. It is not a structure but a heap of unburnt bricks hanging in mid air; mathematical or physical basis, it has very little.

Moreover, a casual look into the Training School Examination papers will reveal how little importance is attached to the subject by the examiners themselves. In some years, in the methods paper for the Secondary Grade there are no questions in Geography. Sometimes there is a question relating to notes of lessons, found as one of six alternatives, which the candidates will not even look into. But in some years Geography rises to its full stature by one full question being set apart for it; but very often the question is as vague and as indefinite as possible. Probably this is due to the fact that the 'Methods' paper for the Secondary Grade is set by one examiner with or without experience of teaching the particular subjects. The examiner, in the nature of things, cannot be a specialist in all the subjects like Mathematics, Geography, English, Science or Vernacular and hence he has to depend on the papers for the three previous years and the very vague and meagre syllabuses on the subjects for setting the methods paper and hence it is no wonder the paper is unsatisfactory. This defect can be easily remedied by four or five specialists in the several subjects, with actual experience of teaching them to students under training, being asked to set three questions each, out of which two may be chosen by the T.S.L.C. Board. Further every paper setter must be required to furnish the Board with 'Model' answers to his questions so that there may be definiteness about the answers expected from the candidates.

If we come to Higher Grade Training we find one redeeming feature in Geography being made a compulsory subject. The syllabus too has been recently revised, but the effect of the revision does not seem to have been felt in the actual teaching of the subject in the schools. Even now we find question papers in which the place names of the 19th century are given, for instance Constantinople instead of Istambul. I am also reliably informed that the students in many of the schools have not seen post-war maps

at all. One may wonder why such a system of examination is going on for a long time. The simple reason is that these T. S. L. C. papers unlike those for the S. S. L. C. are never subjected to public gaze or criticism. The general public have not yet realized the need for taking interest in the training of teachers, for it is these pupil teachers who ultimately shape the kind of education that is imparted in the Middle and the Elementary Schools.

Until these permanent reforms in connection with the staffing, text-books, and examination for Training Schools are effected, I venture to suggest a temporary remedy in the shape of a vacation course of training lasting for about six weeks or so and arranged at 3 or 4 convenient centres and specially designed for teachers in the Training Schools who are now handling Geography. Since over 50% of these are Government institutions the Department should undertake the work in right earnest and if for any reason it is unable to organise these schools it should give adequate facilities to the Madras Geographical Association to organise these Summer Schools intended mainly for the teachers in Training Schools. The teachers should be given facilities to avail themselves of these courses. Let me conclude by appealing to all those interested in Geography to do their best to bring about the desired reforms at the source and thereby effect a radical cure.

Progress of Geography IN THE FIELD AND IN THE STUDY DURING THE REIGN OF HIS MAJESTY KING GEORGE THE FIFTH: BY THE RIGHT HONOURABLE SIR HALFORD MACKINDER, P.C.*

* * *

The change in the power of geographical investigation which has come about in this quarter century is indeed one of revolution, rather than of mere progress. Ladies and gentlemen, I make no apology for venturing beyond my allotted span of twenty-five years. The shadows cast before us by threatened events are among the major causes of the present troubles of mankind. There is not much use in a survey of the past unless it leads us to a fresh insight into the present and a new vision of the future. Is not the crisis of today, which penetrates into every human activity and almost every larger thought, essentially geographical in its origin? Mankind has suddenly become world conscious and has taken fright. The nations have run to their homes and are barricading their doors. They have realized that henceforth they must live in a closed system in which they can do nothing of which the repercussion does not come back upon them from the very antipodes. In an age that may become cruel, because imprisoned, their first impulse has been to make sure of their castles of refuge.

* * *

You may tell me that all men have long known the world to be round, and that the Greek philosophers knew it more than two thousand years ago. True, but that was an academic dream. It was not till Magellan showed the way round that mankind at large woke to the actuality. Shakespeare made Puck put a girdle round the earth in forty minutes; that was a poet's embroidery on Magellan's achievement. But when discovery attains to the very poles, and you fly to Australia in fewer days than it took weeks, and you speak to New Zealand with the speed of light, mankind awakes with a shock to reality. What was a statement of the text-books has become a business fact.

You may tell me, and some of your recent predecessors, Mr. President, have emphasized the statement, that the discovery

* From the Jubilee Address delivered before the Royal Geographical Society, on 13th May 1935, and published in the Geographical Journal, Vol. 86, No. 1.

of the world is not yet nearly complete. Quite true: I have been told that in the Himalayas alone there are eleven hundred peaks over 20,000 feet waiting to be climbed. For many a long day there will be scope for bold deeds in the field, and patient toil in the study. But we have taken the measure of our problems. We know that we can if we will. The steel frame of our building is complete; we have now only to hang up the walls upon it. The effect of the shadow which will be cast on ancient lights is already obvious.

Until within the last very few years scientific men in their laboratories and explorers in the wilds went whistling lightheartedly to their labours, confident that their harvest must add to the welfare of humanity. It was General Smuts who, in his presidential address to the British Association in 1931, first sounded a note which brought to the surface an anxiety that was beginning to trouble the inner serenity of science. "One of the greatest tasks before the human race," I quote from Smuts, "will be to link up science with ethical values. A serious lag has already developed between our rapid scientific advance and our stationary ethical development, a lag which has already found expression in the greatest tragedy of history. Science must itself help to close the dangerous gap." In 1932 Sir Alfred Ewing from the same presidential chair echoed the same sentiment: "We are acutely aware that the engineer's gifts have been and may be grievously abused; man was ethically unprepared for so great a bounty." In 1933 Sir Gowland Hopkins, the President of the Royal Society, commented on these utterances as follows: "Of science itself it is, of course, no indictment that the cammand of nature has been put into man's hands before he knows how to command himself." That is, of course, true of science in the abstract. But when Smuts used the word, was he not uttering a challenge to Science in the sense of the world of scientific men? Is there nothing that the masters of research can do to steady the mind of the world which has been so profoundly disturbed by their explosive discoveries? Is there nothing incumbent on us here in this Society who have trained the explorers, sent them forth, and recorded their results?

You will observe that I have ventured to break the question into two: what can science do to help and what geography? Today we are still on the high tide of the Jubilee; our people have seen a vision, have had a glimpse of heaven, have strengthened their will to salvation. But emotion alone is not enough. There must be appropriate mental equipment. Permanently working

forces will soon resume their pressure. Is there any steady current which we geographers can help to set flowing that may tend to bring science into closer relation with the values of life ?

Science is dominated by the idea of research, and naturally so, for the results of science when applied to industry are giving man an almost miraculous control over nature. But research compels specialization, and specialization as a consequence pervades the teaching of science. This is inevitable where the training of researchers and of the technicians who apply the results of research is in question. But what of the training of that great majority who will not be engaged in research but must give themselves just to living ? In these days they too must know something of science, but as part of their equipment for the business of life in the big world, not in the laboratory. The laboratory is specialized, but the world is not. There is of course the division of labour, but the proportion of specialization involved is very different from the isolation and abstraction of thought in the research laboratory. No doubt the researcher is ever on the alert for suggestions from outside, but with the idea of applying them to his special purpose.

It is all a question of which way the eyes of the teacher should be turned, to the increasing of knowledge or to the training of human beings. To the researcher science is an end in itself, but to the teacher it is a means to an end. The teacher can and should think of the bearing of science on the art of living ; in other words, should think of its relation to moral and aesthetic values. To the researcher, as such, that is an irrelevant consideration, perhaps even an impediment.

The whole organization and outlook of the scientific world is to-day turned in the first place towards Research and to the applications of its results, and only in the second place to the education of the people as men and women and as citizens. Is not the geographer a natural teacher of science to the unspecialized citizen ? As a matter of history, is not the parentage of all the specialist sciences to be found in Medicine and Geography ? From these two the sowers went forth to sow : what more natural than that the harvest should be gathered in ? In passing let us note that in Ethics and Politics the Greeks made a distinction in the realm of values which is parallel to the distinction between the mother sciences of Medicine and Geography.

The bridge character of geography, linking physical science to the study of humanity, so far from being the source of confusion

that it appears to the scientist mentality, is the very means, is it not, of effecting what we are in search of, the closer approximation of science to human values ? Indeed is not the still prevalent scientific suspicion and depreciation of geography indicative of limitation of outlook ? I am going to suggest for your consideration that much, very much depends at this juncture on our view here of what should be the scope and methods of modern geographical study.

Consider for a moment the classical education which did, and in our older Universities still to some extent does, associate the study of facts and of values in a remarkable degree. Words and forms of speech are facts ; when written down they become things ; but the scholarship which studies them is always very near to the values of literature. At Oxford the Honour School of Humane Letters, esteemed the highest of the degree examinations, is not a test of specialist attainments, for it demands a knowledge of scholarship, and history, and philosophy. Significantly it has produced eminent and cultivated citizens : Ministers of State, Bishops, Judges, Ambassadors, Civil Servants, Headmasters, and only a minority of scholarly specialists.

Consider now the nature of geographical as compared with scientific research. The physicist or chemist has before him myriads of repetitions of the same phenomena. He abstracts irrelevant aspects and isolates the relevant, and infers a law, such that he can foretell and in suitable cases produce with certainty given results from given causes. But the geographer seeks to decipher the pattern of a unique phenomenon, the surface of this globe. There can for him be no question of law in the physical sense, since there is no repetition of the pattern. Geography no more repeats itself than does History, and though there may be similarities of distribution on the earth's surface, they can but give ground for statistical generalizations, with probabilities, not certainties, for their effect. On the other hand Pattern is complex in the sense that causes of different orders are working together to produce interconnected results. The object of the geographer is to understand the concrete complexity, not to abstract and reduce to simplicity. Both geographer and scientist proceed no doubt by analysis with a view to subsequent synthesis, but the synthesis of the strict scientist is of like with like, whereas that of the geographer is of unlikes.

If this contrast of law and pattern holds good the need of a separation between physical and human geography vanishes. The capricious action of the living Will may be irreducible to law, but it is certainly one of the causes of pattern. For his purpose the

geographer lays all the sciences and humanities under contribution, and incidentally may have to teach both some science and some history. In my view it would be well if of set purpose he undertook such teaching in the case of Science as is required by the young citizen in the secondary school. Then in the mind of the ordinary man you would not have pigeon-holed sciences but a coherent universe tallying with the concrete Universe around.

The habit of accreting new facts to an established mental system must be acquired early. The geographical mentality which stows away new data in their appropriate niches in the world pattern will never be caught from the scientific specialist. Nor can it be learned in the way of information. An informed judgment postulates that the information shall be at call when required. A choice of action is presented to our citizen, say in an election or in the course of his business ; his little conscious self consults his vast subconscious personality, and as the white corpuscles of the blood rush to heal a wound, so all his pertinent information gathers to a point, and by the time that he has wisely slept on his problem, the facts and values have been balanced, and his mind is made up. In a rich but disorderly mind there would have been the same subconscious activity, but facts and values only superficially relevant would have come to the point and the judgment would be unsound. To be a governing influence the world pattern must have slowly imbued the whole subconscious mind.

Is not the imprinting of that pattern well worthy of a considerable part in our national scheme of education ? Like the multiplication table the map of the world is with us for life. Enriched by scientific and historical contributions that map becomes the mental image of a dynamic system. Moved by solar energy from without, the fluid circulations of air and water impinge on the solid forms that are raised and lowered as the result of radio-activity within. Vegetation and soil interact so that they constitute together a single living skin to the Earth, which is of the very stuff of geography, the most intimate meeting ground of all the co-operating influences. We and the rest of the animals are mere parasites on that skin, but since we can move and bite we shape at our will. The Gadarene swine rushed down a steep place into the sea and their infectious panic, a mental phenomenon, presents to the geologist a bone bed. Thousands of fellahin dig the Suez Canal, at the command of a Khedive, inspired by the idea of a de Lesseps, and you have an artificial strait. But the action of man on his environment, and the reaction upon him of the environment as modified by him, does

not end the gamut of the geographical scale. Man is a part of his own environment, as cheese-mites are a part of the cheese. Finally from Man's Earth we rise to one of the greatest mysteries presented by physics and astronomy, the fact that through aeons of time temperatures within the short range between the freezing and boiling of water, 100 degrees Centigrade, have apparently never been absent from this Earth's surface, so that life—dependent on liquid water—has apparently been continuous throughout; while all the time elsewhere in the Universe there reign temperatures down to near absolute zero and up into tens of thousands of degrees. All life on this planet is dependent on an age-long but extraordinarily delicate poise of conditions.

When such a mystically great and yet practically useful geographical harmony is available, why continue to fit pigeon-holes into the minds of our citizens because the specialists who extract our science from the ore have hitherto had a lien on its teaching ? I submit that the functions of research and teaching should be considered as of equal importance, but that they are essentially different in outlook and therefore in mode of work. I have spoken of the education of our citizens of express purpose ; the training of researchers and technicians is another matter.

What is the net outcome of the line of argument I have ventured to lay before you ? What is its bearing on our policy as a Society ? The task of the pioneers having been accomplished what scope have we still before us ? It seems to me as great scope as ever, but partly changed in character.

Every principal department of study has its own technique and its own philosophy. In a general way the element of technique diminishes as the element of philosophy increases. Starting from these premises I see before us four main grades of work. There is first that of the surveyor and cartographer. Here technique, instrumental and mathematical, including geodesy, is at its most exacting pitch and such as to demand a specialist geographical profession.

Secondly, we have the complete study on the spot of limited areas by groups of specialists supplementing one another. Leaders of men are born, but subject to that fact, it is to be hoped that the geographer will be given such share of control as will permit of his exercising his function of correlating the inquiries of his colleagues. For this work the geographical technique of the trained amateur will probably suffice.

Thirdly, we come to the study of the geographical aspects of other subjects. Here it seems to me that the geographer must in general be auxiliary only. He brings to the inter-scientific frontier his maps, ready made, and his trained faculty of thinking visually, but the technique from across the border almost invariably dominates. Consider the case of geomorphology ; you cannot there go far in field research without a complete geological technique. The cases of geophysics and zoogeography are parallel. But with the alien technique there almost inevitably enters also the alien philosophy ; neither the geologist nor the historian easily accepts the regrouping of his facts in another setting. For these reasons I have spoken of geographical aspects of other subjects rather than of special aspects of geography.

That brings us to our fourth category, the study of geography, independent and complete. Here geography is mistress in her own house. With so much experience of surveying as will give him a sense of the resources and limitations of mapping, and such familiarity with maps as will insure his geographical habit of thought, and enough knowledge of the outlook and philosophies of the contributory sciences and humanities to enable him to discount their bias, the geographer is in a position to build upon the static map a dynamic mental image. Equip him with the appropriate literary power and you have the philosophical geographer. His function, be it remembered, is to integrate and not merely to accumulate knowledge. His aim is so to digest the results of specialised research that they become available as a contribution to the assessment of values. Only so, or in some such way, does it seem to me that science itself can be adapted to the bridging of the gap between science and values, which gap is admitted to be a danger to civilisation by the great scientific and philosophical leaders whom I have cited earlier in this address. A comprehensive idealistic science is the natural and appropriate counterpoise for the materialism of the specialist sciences, which of late have become unduly influential because of their brilliant application to the arts both of peace and war.

It will be seen that, in my conception, the first and fourth of our categories give us the essence of geography ; the second and third, though by no means to be neglected, are only geographical by the way. The fourth in its present outlook and ambition is something new. In this Society we can if we will marry the geography of the Ordnance Surveyor to that of the Professor. The University schools of geography owe their origin to the policy of

this Society, initiated fifty years ago by Douglas Freshfield. To-day they should be a source of strength to their parent.

Let us recognize that academic opinion, perhaps the major part of it, still undervalues the potentialities of geography, and that there is in consequence some discouragement among some of our Professors. The best type of student is often persuaded into other paths by the idea that geography is a soft option in the curriculum. The Professor of Geography is at times conscious that beneath the friendly comradeship of the Common Room there is a covert denial of his real equality of status. This would not so much matter did it not affect the estimate of their own subject held by geographers. Too often do they not try to appease the critic by differentiating between Physical and Human Geography—to the extent that in some Universities their teaching is divided between two faculties, thus sacrificing to the specialists its highest virtue? Since success in research is to-day the chief criterion of academic distinction, and since purely geographical research is not, except in such a branch as geodesy, of a kind that, however, excellent, normally wins entry to the Royal Society, there is the standing temptation for the Professor of Geography to pursue his investigations in some borderland.

Far be it from me to undervalue such useful and often very fruitful lines of research; where men have come to geography from eariler training in some other subject they offer a natural scope. And far indeed am I from under-estimating the impulse to scientific devotion which possesses those who come within the aura of the Royal Society. The Fellowship of that Society is the noble compensation of those who submit for a great end to the self-denials of specialism. But geography must have leaders of a different kind of ambition if it is to carry science as a vital strand into the new humanism demanded by the conditions of our time.

Let us grant that, apart from certain aspects of its technique, geography is not a science in the sense that physics, chemistry, biology, and even geology are sciences. Nor is it one of the humanities, like history. It is something apart—a concrete philosophy, with both scientific and humanistic roots, though with its own technique both of research and expression.

We must look to our Professors to found a new and great tradition both of thought and teaching. We must attract to our cause and hold to our main theme men and women of sufficient ability and attainments for firm grasp, wide outlook, and scholarly power

of expression in a difficult, not an easy, branch of study. They are not likely to win the current honours either of science or literature, for they belong wholeheartedly to neither faculty. If and when the right way can be found, I plead for some mark of distinction to denote excellence in their particular kind of work, a label which may acquire a currency value in the academic world. It is to our advantage that they should rise to position of command in their colleges and Universities, and to that end should have prestige added to them where it is earned and deserved.

One point more. It may be urged that these ideas are a counsel of perfection and therefore impracticable ; that their application would postulate a supply of sound philosophers which, at any rate in geography, is not available. To bend under such criticism would to my mind, be to submit to a fatal pessimism. What was the problem from which we set forth ? Was it not that a dangerous gap has developed between science and values ? The task is to induce the current philosophy of values to take fully into account the recent results of scientific research. General Smuts asks that science shall itself help in this persuasive process. Can science as such help except by presenting its facts in a form which can be more easily assimilated by philosophy ? Because of its twin physical and human aspects I can conceive of no discipline more fitted than geography to take science right up to the gates of philosophy. Like Napoleon's army, science must disperse for supply, but concentrate for action in the field of values. Concentration involves generalship. In philosophy the leaders have always been few and their disciples have gathered round them in schools of thought. It is recognised that in solitude even the best philosopher may lose his balance of judgment. There is an essential interplay between the imaginative lead of the few and the critical reception by the many.

The present trouble with our University schools of geography is, as it seems to me, that there is no adequate common tradition binding them together in aim and outlook. If the efforts hitherto made by this Society to bring them together have not met with complete success, the reason may have been that the attempts were not quite whole-hearted and persistent, or more probably that the time was not yet ripe. Within a generally accepted philosophical scheme there would be both enough guidance and enough freedom for many to do good work who could not themselves handle the larger ideas with mastery. Let us not forget that there is a specialism proper to the strictest conception of synthetic geography. As European Society is divided horizontally into classes and verti-

cally into nations, and as proverbially it takes all sorts to make a nation, so geography offers special aspects to be studied by hybrid technique, but also presents regions to be philsophically viewed in all their aspects interlocked.

It is pertinent to remember that outside the Professorial ranks, including within them some notable surveyors and cartographers, there is a body of four thousand school teachers of the subject, gathered in the Geographical Association, to whom a coherent, generally accepted, and understandable conception of geography would be of the greatest advantage for holding their own in the scholastic environment. But I do not contemplate that teachers for secondary schools, vitally important as they are in a democratic Society, should be the only output of the University teaching of geography. In its setting as a prime element in the new humanism, geography should be brought to bear on the training of those citizens who, outside the technical callings, have in the past found in the classical education a way to eminence in Church and State.

Electrification of the Madras Presidency

MAJOR HOWARD'S NINE-AREA PLAN *

This scheme contemplates the division of the presidency into nine power areas, namely, *Mettur, Madras, Anantapur, Periyar, Papanasam, Pykara, Vizagapatam, Bezwada and Chettipet.* The Madras and Pykara power areas already exist, though they have to be further developed. The Mettur area is now to be formed by the inauguration of the Mettur hydro-electric scheme, while proposals are to be submitted for forming the remaining power areas, except, possibly, Periyar, within the next five years.

Some of the power areas will operate together, and there will be an interchange of power between stations to conform to load and water conditions, so that each generating plant may be operated to the best advantage.

According to the present proposals hydro-electric stations will be started at Kolab, Chettipet, Moyar, Periyar and Papanasam, and thermo-electric power stations at Vizagapatam, Bezwada, Pamidi, Tanjore, and Maniyachi.

PYKARA PROJECT

It is estimated that within two years the Tamil districts will have a well regulated supply of electricity from Pykara and Mettur. The attempts of the Government to popularise electric power have been more than amply rewarded and the demand for power from Pykara is very great. The increasing number of inquiries for power from commercial bodies and the growing economic nationalism in this part of the country show that the demand for power will be greater in future than was anticipated when the Pykara scheme was conceived and laid out.

The Pykara Hydro-Electric project, as at present designed, provides for a minimum continuous output of 5,900 K. W. and a

* Major H. G. Howard is the Chief Engineer for Electricity, Government of Madras. He calls it 'a National Scheme.' The aim of the scheme is to bring within the reach of the remotest village in the Presidency electric power which has hitherto been a luxury of the rich in urban areas. The attention of our members is also invited to our article on 'The Mettur Dam', in Vol. IX No. 2, of the J. M. G. A.

maximum possible demand of 15,000 K. W. It was assumed that after the tenth year of operation, additional water storage would be necessary and other line extensions would have to be constructed in order to utilize the ultimate capacity of the machinery installed. The demand for power is, however, much greater than was anticipated, and is steadily increasing.

The situation, it was thought, compelled immediate action, and the Government had to ask of the Legislative Council in February last for a supplementary grant of Rs. 60,000 to lay the foundations for the proposed Mukurti storage reservoir. The grant was sanctioned.

MUKURTI RESERVOIR

The necessity for the construction of the Mukurti reservoir was created not only by the unanticipated but healthy demand for power in the Pykara area, but also by the extra load coming on in the Trichinopoly and Tanjore districts, which was not taken into account in the Pykara report. Although it is proposed, eventually, to relieve the Pykara system of the loads in these two districts by transferring it to the Mettur Hydro-Electric Project when it is completed the extension of the scheme to Madras would have been completed by that time and additional power would be required in the latter area.

The Chief Engineer for Electricity has, therefore, submitted proposals for a storage reservoir by constructing a dam across the Mukurti river at a site ten miles west of Ootacamund.

It will be interesting to note a few details about the Mukurti reservoir. The altitude of the Mukurti river bed at the site of the proposed dam 6,795 ft. above mean sea level, and the natural configuration of the country offers an excellent site for a storage reservoir. The dam, as designed, will be 90 ft. high, above the level of the river bed, and the reservoir will have an effective capacity of 1,600 million cubic feet, it will give a continuous flow of 185 cusecs for 100 days.

The cost of the work is estimated at Rs. 21,25,000. The first stage of the construction programme is to store 500 million cubic feet of water. This work will be completed in about 2½ years at a cost of about Rs. 16.00,000.

As soon as the Mukurti reservoir is completed the minimum continuous generation possible, with the existing equipment of the

Pykara system will be increased by at least 12,500,000 annually, representing a gross revenue of about Rs. 400,000. The operation and maintenance expenses on the dam will be negligible, and taking the scheme by itself, it will be highly remunerative, with a net revenue of Rs. 2.75 lakhs.

METTUR SCHEME.

The Mettur Hydro-Electric Project, which the Secretary of State for India has approved, forms part of a comprehensive scheme for the gradual electrification of the Madras presidency and for the supply of cheap electric power.

The Mettur Dam, one of the largest structures of its kind in the world, is 176 feet high and can impound a total of 93,500 m.c.ft. of water. This storage is primary for irrigation purposes, but the water let down for irrigation is also to be utilized to the best advantage for the generation of hydro-electric power. During the construction of the dam, 4 pipes 8.5 feet in diameter were built into the structure and equipped with the necessary valves, gates, screens, and other fitting. The function of these pipes was for surplusing from the reservoir during the latter part of the construction period, and for power generation afterwards. The total cost of this hydraulic installation was Rs. 10,80,000 and the amount is debited to the Hydro-electric scheme and included in the estimates.

The operating head will vary from 160 feet at full reservoir level to a normal minimum of 80 feet. The average head will be 135 feet. Under such water conditions a minimum demand of 19,200 horse-power, or 7,680 horse-power continuous, may be met without the assistance of other plants. It is under these conditions that the commercial prospects of the scheme are judged. By operating Mettur in conjunction with Pykara or an auxiliary steam plant, higher demands for power may be met. Short-time assistance from Pykara or an auxiliary steam plant is necessitated for greater outputs by the fact that the storage is essentially for irrigation purposes and the power plant can use only the water let down for irrigation, which is an enormously varying quantity ; whereas for power purposes, continuity of supply is essential. Not more than 1,000 cusecs will be available during irrigation closure season. When the possibility of generating hydro-electric power was first considered—and pipes provided in the dam—it was the intention of the authorities responsible to change the crop season in the new area to be supplied, so that among other advantages continuous supply may be available for power purposes. This, however, was not finally ac-

cepted by the Government and the scheme as now designed assumes that the same seasons will be adhered to in the new as well as the old area. The following figures give an approximate idea of the maximum output under varying conditions :—

	Peak Horse Power	Base Horse Power
Mettur alone with no restriction in irrigation ..	19,000	7,700
Mettur alone with limited restriction in irrigation about twice in 15 years ..	19,000	13,000
Mettur with Pykara (present installation only). No restriction for irrigation ..	23,000	9,500 to 12,000
Mettur with Madras and|or an auxiliary Steam plant ..	45,000	24,000

In an emergency, as much as 6,000 horse-power might be generated under certain water conditions.

A normal feature of the scheme will be the availability of what is called secondary and tertiary power as contrasted to the primary power which should be available for all time. The secondary power will be restricted only in the dry years and tertiary power will be available for eight months in the year.

The restriction on irrigation is explained in the Mettur hydro-electric project report. For a comparatively small restriction of irrigation flow of a few weeks twice in 15 years, the reservoir working tables could be so modified as to increase, appreciably, the potential power output and the earning power of the project. The present scheme does not, however, contemplate any restriction in the irrigation flow for power purposes, but is based upon the minimum output and least favourable conditions.

POWER PLANT

It is proposed to install four double horizontal Francis turbo-generator sets of 15,000 horse-power each, one of which will be spare. Only two units are to be provided at first, the third will be added in the third year and the fourth in the seventh year of operation, should load conditions justify the additional generating capacity.

The original scheme included four single vertical units of 13,000 horse-power each, but the Consulting Engineers to the Secretary

of State for India preferred the arrangement indicated, and their recommendation was adopted. The plant, when completed, will thus be capable of a maximum output of 60,000 horse-power.

The generators will operate at 11,000 volts, 50 cycles, having a normal rating of 12,500 K. V. A. each. They will be specially designed for transmitting power eventually to Madras and will be equipped with a modern 'quick response excitation' system.

The power-house buildings will be about 375 feet long of simple design, and will harmonize with the dam structure.

The transformer station is to be of the outdoor type similar to that at Pykara, and will be designed to operate at 66,000 volts initially, and 110,000 volts eventually. The transformer units will be of the same capacity as the generators.

TRANSMISSION SYSTEM

Two 110/66 K.V. circuits on steel towers will be constructed to a point near Singarapet 66 miles from Mettur, and will form a section of the future trunk lines connecting Mettur and Madras. From this terminal a single circuit 66 K.V. lines will be constructed to Vellore via Ambur, while another line, at 33 K.V., will go ultimately to Vellore via. Polur and Arni, thus constituting an extensive high voltage ring main around the Javadi Hills. A 66 K.V. line is also to be constructed from the same point to Villupuram, to supply the area served by the South Arcot Electricity Distribution Company, which includes the towns of Cuddalore, Villupuram, Chidambaram and several important villages. It will be possible to supply from this extension, also Pondicherry which appears to have good load possibilities.

A double circuit 66 K.V. line between Mettur and Erode will be provided for operating in parallel with the Pykara System and for supplying the Trichinopoly and Tanjore districts.

Special arrangements are to be made at Erode receiving station for synchronizing the two systems together.

The Trichinopoly-Negapatam transmission system is now under construction and is expected to be in operation as far as Trichinopoly in April, and as far as Negapatam about October. This system forms a natural part of the Mettur Scheme, although till the Mettur station is in service, the power-supply will be from Pykara. The amount of energy which can be transmitted satisfactorily to

those areas from Pykara is limited, so that it is highly important for those districts to be supplied from Mettur as soon as possible.

There are two circuits from Erode to Tanjore 111 miles, and a single circuit of 50 miles from Tanjore to Negapatam. A line, 21 miles long, will supply power to Papanasam and Kumbakonam from Tanjore. The important loads of the Negapatam Rolling Mills, the Golden Rock Workshops of the South Indian Railway, the Trichinopoly Srirangam Electric Supply Corporation and the East Tanjore Electric Supply Corporation are to be supplied from these lines.

TOTAL COST

The total cost of this complete system is expected to be around Rs. 42.5 lakhs, which is to be debited to the Mettur Scheme as soon as it is transferred. This expenditure has already been included in the project estimates. As soon as Pykara is relieved of the load at Trichinopoly and Negapatam, it is proposed to transmit power to Madura in a similar manner, and when the demand for power at that place reaches a certain limit the Periyar hydro-electric project should be taken in hand.

The Erode-Salem system was the first electricity distribution scheme started by the department. The system was constructed at a total cost of Rs. 4.3 lakhs in 1931, and until Pykara power was available, purchased electricity from the Mysore Government.

It is proposed to transfer this property to the Mettur Scheme because being nearer it can be more economically supplied from Mettur than Pykara. The total cost of the system is to be debited to Mettur and has been included in the estimate for the project.

A summary of the approximate mileage of transmission and distribution lines included in the project is—

110,000	volts lines	double circuit	..	66
66,000	”	”	..	148
66,000	”	single circuit	..	200
33,000	”	”	..	160
22,000	”	”	..	90
11,000	”	”	..	200

SUB-STATIONS

One of the features of this scheme is the rural distribution system at 66,000 and 33,000 volts mainly in the North Arcot area. In many cases distribution is to be effected direct from the high volt-

age lines. For this purpose an economical and standard type of transformer station has been designed.

The sub-stations contemplated in the scheme are as follows: Receiving and transforming stations at Erode, Singarapet, Trichinopoly and Negapatam, with stations of lesser importance at Tiruvarur, Tanjore, Papanasam, Karur, Villupuram, Vellore and Tiruvannamalai. Smaller transformer stations are to be located at Polur, Tiruppattur, Ambur, Vaniyambadi, Jalarpet, etc.

The districts to be served are North Arcot, South Arcot, Chittoor, Salem Trichinopoly Tanjore and, later, Chingleput and Madras. Generally speaking, all towns and villages in these districts will be gievn electric supply, whenever the demand is sufficient to justify the investment in lines and transformers.

DEMAND FOR POWER

The estimates of load and revenue are based on the actual requirements of the various licensees who have agreed to take power-supply, on the results already achieved in the Pykara area, and on the experience of the Mysore and the United Provinces Hydro-electric undertakings.

Particular attention is to be paid to agricultural requirements, for which the area to be served holds out great promise. In the Coimbatore district alone, in less than two years, over 1,000 horsepower, in pumps are already connected or, agreements have been signed. The development of this class of load is as yet, only in its preliminary stage.

Boring for water in a systematic manner, as in the United Provinces, is being advocated for those areas where water is scarce.

In order to speed up development beyond that contemplated in the estimates, proposals for starting certain specialized industries, at or near Mettur, have been suggested in the project report.

Generally speaking, the load situation is even more favourable to-day than when the estimates were prepared.

There have been important inquiries for future power services from various parts of the area included in the scheme. New sugar factories are to be established and textile mills of various types are projected at Salem, Karur, Trichinopoly and Tanjore, so that, taken in all, the commercial outlook is promising.

RATES FOR ELECTRICITY

The rates for electricity throughout the whole area will not be higher than those prevailing in the Pykara system at present.

An effort will be made to maintain similar tariffs in both power areas.

FINANCES

The total expenditure on the scheme is estimated to be Rs. 192.600 lakhs, Rs. 138.648 initially and Rs. 53.952 in ten years.

These figures do not represent actual cash outlay. Of the above, debt adjustments for works already constructed amount to Rs. 57.440 lakhs (Rs. 10.80 lakhs for hydraulic works), and approximately Rs. 5.00 lakhs for buildings, construction, plant and tools, etc., transferred at Mettur. This reduces the actual cash outlay for the initial works to about Rs. 76 lakhs.

The financial forecast for the tenth year of operation, according to the Government formula, for remunerative works, results in a gross return of 11.4 per cent. If all interest deficits accumulated during the development period are capitalized and all operating expenses deducted, the net return is 7.9 per cent. with a surplus of Rs. 2,88,800.

The latest estimates are in excess of those given in the hydro-electric project report by Rs. 10.60 lakhs or nearly 6 per cent. The increase is due to the higher cost of the power plant on account of the adoption of certain recommendations of the Consulting Engineers to the Secretary of State for India and an allowance in some cases, for the higher prices of plant and machinery over those of 18 months ago, when the project estimates were prepared.

The estimates are now believed to be on the conservative side, that is, the expenditure is expected to be slightly below the estimated cost, while the revenue anticipated should be easily reached if normal business conditions continue. A safety margin is considered justified in development schemes of this nature where the greater part of the cost of production is due to fixed charges, and the risk of over-capitalization must be carefully guarded against.

The scheme is attractive, being both technically and economically sound. It possesses greater revenue potentialities than can be judged by the financial forecast, since the latter is not based on the maximum power output.

It is hoped that the whole scheme will be in commercial operation within 2½ years.

Products of Indian origin will be used wherever possible, and it is proposed to start the manufacture of certain equipment and fittings for transmission lines and sub-stations at the Mettur Workshops.

—*From The 'Madras Mail'.*

A Four Years' Scheme for Seniors

BY

L. P. THOMAS, B.Sc.

The work of any one year can be divided into three major sections, which should run concurrently :—1. World Study—study of some one or more continents ; 2. General Geography, as required to illustrate facts under section 1 ; and 3. Practical Work.

1. WORLD STUDY

The *arrangement* of the continents for a four year course vary considerably. Some take a 'horizontal' combination :—(i) The three southern continents ; (ii) The three northern continents ; others take a 'vertical' combination :—(i) North and South America, (ii) Europe and Africa, (iii) Asia and Australasia ; a third arrangement is a mixture of the previous two :—(i) Africa and Australasia, (ii) North and South America, (iii) Eurasia. Each combination has its advantages and its disadvantages but the third arrangement is to be recommended because there is the advantage of treating the Americas and Eurasia as a whole for some lessons, e.g., the Rockies and the Andes. In such an arrangement the British Isles should be taken in the fourth year along with World Revision.

Whatever arrangement is used there should be a sequence of '*one-idea*' *maps* for each continent ; in the sequence recommended there would be five sets—Africa, Australia, North and South America, Eurasia and the British Isles. A sequence may consist of the following maps:—physical features, temperature (Isotherms) rainfall (Isohyets), vegetation, natural regions, industries, and population with important towns and ports. A simple geological map should be added for the British Isles. The whole sequence of maps should be 'on view' at the same time so that there can be continual cross reference. The finest arrangement is to have each set of maps fixed on a light frame to hang from the ceiling by ropes over pulleys. Any sequence of maps can be lowered to the pupils' eye-level for teaching at a moment's notice. A hanging (counter-poised) globe would make this section complete.

Method of treatment. Let us take North America as an example.

1. *Position.* (a) Its discovery (correlating with History). (b) What is meant by saying that "the sun that bids us rest is waking our brethren 'neath the Western sky". (c) How we get there to-day, our ports, their ports, dangers, time difference and time adjustment on ship.

2. *General Physical aspects.* (a) Size comparisons, use of latitude lines—The zones—What deductions can be made? (b) General build, e.g., the Rockies—the effect of position on altitude, the passes for transport and communication, etc.

3. *Climate.* (a) Note the seasonal rainfall. (b) Temperature. In using isotherm maps have them labelled 'January' and 'July' rather than 'Winter' and 'Summer.'

4. *Vegetation.* (For discussion of industries later).

5. *Natural Regions.*

6. *Man and his work.* This can be taken in various ways:—(a) by the Natural Regions in turn, e.g., Eskimos of the Arctic, lumberers, fruit-growers, fishermen of the North-East Region: Cattlemen of the drier plains and agriculturists of the wetter plains and so on: then irrespective of the Natural Region come the minors and manufacturers; (b) by taking each type of work in turn e.g., trappers; fishermen—East for cod, etc., and West for salmon;—cattle farmers—for beef in the prairies and for dairy produce in the St. Lawrence area; fruit growers—British, Mediterranean, North-East areas—and so on.

7. *Population, Towns, Transport*, etc., can be discussed at the same time with either method. ....

8. *The British Isles* can be treated in much the same way as the continents except that along with the build some elementary geology should be added for discussing scenery value of certain rocks to man (coal, granite, slate, clay for bricks, chalk and limestone for lime and cement and water-supply).

2. GENERAL GEOGRAPHY

This should be taken in correlation with the first section and as required. Using North America again as an example the general geography would include *rotation* and *revolution* for the study of day and night and seasons (eighteen hours day light in the wheatlands) continental shelf for fishing; special winds like chinook, cyclone, tornado, hurricane, and their effect and so on.

3. PRACTICAL WORK

Use of Ordnance Survey maps of the district, e.g., marking the crops for successive years to show rotation, outdoor work, study of the routes, etc.

THE FULL FOUR-YEAR SCHEME

First year.

A. Africa and Australasia.

B. Latitude and Longitude (time sums)—Shape of the earth —Distribution of land and sea—Position of over-head sun—Migration of the wind belts—Rainfall—Temperature (sums dealing with altitude included—River geography—Irrigation.

C. Contours—Problems involving them—Use of 6-inch Ordnance Survey map of the district.

Second year.

A. North and South America.

B. Rotation and Revolution—Day and night—Seasons—International Date Line—Ice geography (glaciers, icebergs)—Continental Shelf—Inland drainage.

C. 6-inch and 1-inch Ordnance Survey Maps.

Third year.

A. Eurasia.

B. Coast Formations (Fiords, haffs, dunes)—Simple classification of rocks—Folding, etc.,—Erosion and denudation—Special winds (typhoon, siroco, fohn, monsoon)—earthquakes and volcanoes.

C. Building up maps from given data and describing country depicted by contour maps.

Fourth year.

A. (1) British Isles. (2) World revision by taking the major Natural Regions in turn—using the scheme indicated above—Arctic, British, Mediterranean, Interior or Temperate grassland, Tropical (Sudan) Desert, Monsoon, Equatorial, and Plateau regions.

B. Land forms—Simple geological studies (British Isles) —Eclipses—General revision.

C. General map work using various kinds of Ordnance Survey maps. Sample maps can be obtained and a series of questions set on each for individual work.

Two interesting features that should be included where possible—(1) Meteorological station, (2) Factory visits.

—*From School Mistress.*

Geography and Education

I

*Revised syllabus in Outlines of Geography (Group A) under the 1929 Scheme for the S. S. L. C. Public Examination 1937.**

The revised syllabus in Geography is based on the expectation that two periods per week would be devoted to the subject in the 5th and 6th Forms. As indicated in the syllabus 90 lessons are provided for the 2 years, leaving a margin of 10 for holidays, occasional tests, etc. As in the case of other subjects the last term of the 6th Form is left free for revision. The deletions and modifications made from and in the syllabus for 1929 are noted in the Appendix. Since India would have been dealt with extensively in the 4th Form in 1934-35, no detailed syllabus as regards it is given. But 10 periods of time are allotted to the revision of India as done already in the 4th Form.

REGIONAL GEOGRAPHY OF THE WORLD

(Adapted from the 1929 syllabus)

Vth Form.—Southern Continents and North America—60 lessons.

VIth Form.—Eurasia with revision of India done in Form IV —40 lessons.

Vth Form.

Australia (8 lessons).—Relief and Rivers ; Climate and Natural Vegetation. Life and work of the people with special reference to (a) East Coast Region, (b) Murray-Darling Basin, and (c) Mediterranean Regions of West Australia and Victoria.

Africa (12 lessons).—Structure, relief and coast-line; Rivers and lakes. Climate and vegetation; Duplication of climatic and vegetation belts, north and south of the equator. Human Geography of the Nile Lands, the Equatorial Highlands, and British South Africa.

* The revised transitory syllabus closely follows the '1929' syllabus. The portions omitted from the original syllabus are put together separately in the form of an appendix—Ed. J. M. G. A.

South America (12 lessons).—Structure and relief; rivers; climate and vegetation; Peoples and States. Human Geography of (a) temperate countries; Argentina and Chile; (b) Tropical countries; Brazil; and (c) Andean States : Ecuador, Peru and Bolivia.

North America (18 lessons).—Structure and relief; Rivers and lakes. Climate and vegetation. Population and political divisions. Human Geography of the Continent under the following divisions: I. *United States* : (a) North-Eastern industrial and commercial region; (b) Central farming region, (c) the basins and the mining regions of the Rockies and (d) Pacific Shorelands.

II. *Dominion of Canada and Newfoundland* : (a) Eastern Canada, (b) Prairie provinces, and (c) British Columbia.

III. *Mexico, Central America and West Indies.* (Altogether 50 lessons with 10 revision lessons make 60 lessons).

VIth Form.

Eurasia (31 + 9 lessons).—Surface,. relief and rivers. Climate and climatic regions.—8 lessons.

Regions of Europe.—British Isles : Relief and climate; Fisheries and farming; the chief industrial region and their outlets.—3 lessons.

Western Mainland of Europe.—France—Agriculture and Industry; position of Paris and Marseilles. Belgium—Plain of Flanders and Sambro-Meuse Valley; Holland—A delta region reclaimed from the sea; its colonies and sea-trade. Denmark Co-operative Dairy Farming. Germany—Plain and plateau, forestry and development of special industries; Industries of the Ruhr and Saxon coal-fields. 4 lessons—1 each for France and Germany and 2 for Belgium, Holland and Denmark.

Baltic Region.—Scandinavian peninsula—forestry and woodwork of Sweden.—1 lesson.

Central Highlands.—Czecho-Slovakia—its mineral and industries; Agriculture of the Mid-Danubian plain.

Alpine Region.—Development of hydro-electric power and effect on industrial development.—3 lessons.

Mediterranean Region.—Spain—its mineral wealth but lack of coal. Italy—alluvial plain of Lombardy and its industrial development ; peninsular Italy—3 lessons.

South-Western Lands of Asia.—Region of plateau and deserts with one important plain.—2 lessons.

Eastern Europe.—Rich wheat and pasture lands of Rumanian and Russian plains.—1 lesson.

China.—Effect of climate and relief upon occupations and industries.—2 lessons.

Japan.—A mountainous country, yet productive; agricultural, mineral and industrial development; importance of Korea.—2 lessons.

South-East Asia and East Indies.—2 lessons.

Revision of India.—Done in Form IV according to 1934 syllabus—9 lessons. Altogether 40 lessons for two terms. IIIrd term general revision.

APPENDIX

Portions omitted from the original 1929 syllabus in the Transitory Syllabus for 1937 Examinations.

Australia.—" The seasonal distribution of temperature and rainfall." Relation between rainfall and natural vegetation regions of Australia; peculiarity of its animal life." " Favourable position for trading with lands around the Pacific and Indian Oceans."

Africa.—" Apparent seasonal migration of the sun." " Peoples of Africa." " Trade routes of the Indian Ocean."

South America.—" The effect of a mountain barrier, of a cold current and of altitude upon rainfall and temperature." " The important of minerals in the past and present development of the continent."

North America.—" The work of rivers as illustrated on a large scale by the Colorado and the Mississippi and as seen by actual observation of local streams." " Factors that modify climate as evidenced in North America."

Eurasia.—" Comparison of temperature conditions on east and west margins; effect of latitude and distance from the sea on range of temperature; causes of monsoons and their effect on climate of South-eastern Eurasia." " The new border-states". " Desert conditions of the Aral Sea basin; tundra, taiga and steppe of Siberian

plain; contrast development of this region with the similar region in North America.". Dependencies of China.

Part IV—*The World* is completely omitted.

India in the 1929 syllabus is substituted by India according to the 1934 syllabus as revision work in Form VI, as the latter has already been done in Form IV in 1934-35.

World Region.—(Part II of 1934 syllabus) is also omitted and should not be examined upon as most schools had not adjusted themselves to the new syllabus and could not cover beyond "India" in that syllabus, especially as the pupils had no text-book available during the year.

II

*S. S. L. C. Examination, 1936 : Geography, C Group. North America, East of the Prairies.**

1. *A general study of the region as a whole* to bring out its unity and the difference between it and the rest of the continent, including

1. Relief—the Appalachian system in the North and South, the differences and the causes of these differences; emphasizing specially glaciation. The coastline in the North and South (treated as above). The coastal plain in the North and South (treated as above).

2. Climate and its causes,

3. The history of the settlement of this region and the influence of the historical factor on the present occupations and distribution of population

2. A detailed study of the following sub-divisions, including in the case of each, the relief, climate and development, but with special emphasis on the points noted below as the outstanding features of the region.

1. *The Northern Appalachian Regions.*

A. Newfoundland—Fishing and other industries; their development and the reasons for this.

* A detailed syllabus for the Major Natural Region prescribed in Geography (Group C). Ed. J. M. G. A.

B. The Maritime Provinces of Canada—Agriculture and fruit farming; forestry; mining.

C. The New England States—Manufacturing and its historical development; types of manufacture and the reasons for the localizations of these industries; cities; the specialised agricultural development.

2. *The Southern Appalachian Regions i.e.*, south of the Hudson.

A. Coastal plains and agriculture.

B. The Fall Line and routes to the interior.

C. The Piedmont plateau.

D. Ridges and valleys of the Alleghenies; coal and iron manufacturing.

E. Cities of this region with special emphasis on New York.

3. *The St. Lawrence Lowlands.*

A. Lake Peninsula, its special climatic condition and fruit farming.

B. The lower St. Lawrence basin—lumbering and agriculture: cities and their location and development.

4. *The Great Lakes*—Formation; the improvements in the natural waterway (Soo Canals, Welland Canal) trade on the lakes (wheat, iron). Lake cities and their growth, and the factors in their development.

5. *The South-eastern Plantation Region.*
Cotton and other crops.

6. *Florida*—Its specialised development.

Geography in the Indian Science Congress

A NOTICE

I

[Friends of 'Geography' in South India will be glad to hear that Geography has been classed with Geology as a separate section. We congratulate Mr. B. Rama Rao of the Mysore Geological Dept. on his being chosen to preside over this section. It is hoped that at least some of our members would attend the Congress.—Editor J. M. G. A.]

The Twenty-third Annual Meeting of the Indian Science Congress will be held in Indore from January 2nd to 8th, 1936.

Intending members are requested to send their subscriptions to the Congress to the Treasurer, Indian Science Congress Association, Asiatic Society of Bengal, 1, Park Street, Calcutta, and the annexed form to the Managing Secretary, Indian Science Congress Asociation, Asiatic Society of Bengal, 1, Park Street, Calcutta.

Particular attention is drawn to the fact that the 18th Congress, held in 1931, adopted a formal Constitution by which the Congress has been converted into a Permanent Association with continuing annual membership. The Ordinary Members of the Congress in its new form enjoy all its privileges. The Session Members (divided into three classes: Full Session, Associate Session, and Student Session Members) enjoy restricted privileges and have no voice in matters of Congress legislation or policy.

Applicants desiring to join the Association as Ordinary Members for future years may state on their application for Sessional Membership after the 15th of July of any year. They will then be entered as Session Members in the next coming Congress and automatically transferred to the roll of Ordinary Members from the following year.

Application forms for Ordinary Membership in the Congress may be obtained at any time from the office of the Asiatic Society of Bengal, Calcutta.

Papers submitted for reading at the Session of the Congress can only be submitted by Ordinary and Full Session Members, or through Ordinary Members.

No papers are admissible for reading at the Session by any one who has not been enrolled as a member by the 15th September, 1935.

All enquiries as to accommodation should be addressed to The Local Secretaries. It is particularly requested that very early intimation of the accommodation required should be sent to the Local Secretaries.

II

EXTRACT FROM THE RULES

2. The Association shall consist of Ordinary Members and Session Members.

3. Ordinary Members of the Association shall have the right to contribute papers for reading at the Session of the Congress, to receive free of charge all publications issued by the Association, and to fill any office in the Association on being duly elected thereto.

4. The annual subscription of Ordinary Members shall be Rs. 10. The subscription shall become due on the 1st February of each year, and shall only be effective as a payment for Ordinary membership subscription if received before the 15th July of the year.

5. Any Ordinary Member may compound for the payment of all future annual subscriptions by the payment in a single sum of Rs. 150.

6. There shall be three classes of Session Members :—

(*a*) Full Session Members—Subscription Rs. 10 per Session.
(*b*) Associate Session Members—Subscription Rs. 5 per Session.
(*c*) Student Session Members—Subscription Rs. 2 per Session.

7. Full Session Members shall have the right to contribute papers for reading at the Session of the Congress, and to receive free of charge all publications issued by the Association relating to the Session of the Congress of which they are Members.

Associate and Student Session Members shall have the right to submit papers for reading at the Session of the Congress of which they are Members provided such papers be communicated through an Ordinary Member of the Association.

A Student Member shall before admission be duly certified by the head of his Institution to be a *bona fide* student.

III

OFFICERS OF THE TWENTY-THIRD CONGRESS

President.

Rai Sir Upendranath Brahmachari, Bahadur, Kt., M.A., M.D., Ph.D., F.S.M.F., F.A.S.B., 82-3, Cornwallis Street, Calcutta.

Sectional President.

Geology and Geography: B. Rama Rao, Esq., M.A., Offig. Director, Mysore Geological Department, Bangalore, South India.

Sectional Recorders.

Geology and Geography: Prof. S. K. Roy, Ph.D., Professor of Geology, Indian School of Mines, Dhanbad.

General Secretaries.

W. D. West, Esq., M.A., (Cantab.), Assistant Superintendent, Geological Survey of India, 27, Chowringhee, Calcutta.

Prof. J. N. Mukherjee, D.Sc., F.C.S., University College of Science, 92, Upper Circular Road, Calcutta.

Local Secretaries.

Dr. S. S. Deshpande, Vice-Principal and Professor of Chemistry, Holkar College, Indore.

K. A. Patwardhan, Esq., Daly College, Indore.

Treasurer.

Dr. S. L. Hora, D.Sc., F.L.S., F.Z.S., F.R.S.E., F.A.S.B., 1, Park Street, Calcutta.

Managing Secretary.

Johan van Manen, Esq., C.I.E., F.A.S.B., 1, Park Street, Calcutta.

News and Notes

Mr. N. Subrahmanyam, M.A., L.T., F.R.G.S., the Secretary of the Association left India early in May on a holiday tour. He will travel extensively over the greater part of the British Isles, France, Switzerland, Italy and other countries of North-Western and Central Europe. He is expected to return to India about the middle of October. The Working Council has entrusted the task of carrying on the work of the Association to Mr. G. Narayanaswami, M.A., L.T., the Treasurer.

* * * *

The report of the *Seventh Summer School* of Geography is published elsewhere in this number. The course lasted for three weeks and out of the 37 teachers who attended, 3 were ladies. Twelve of them work in the high school and the remaining are middle school teachers. The thanks of the Association are due to the lecturers for their honorary work in the Summer School.

* * *

As pointed out in the Ninth Annual Report the Coimbatore Branch alone did satisfactory work last year. It is hoped that it will continue to show a similar record this year as well. The branch Secretary, Vizag Branch has promised to put more life into the activities of his Branch. It is earnestly hoped that the Branches will get into regular working condition at an early date.

* * *

In Vol. IX No. 4 of the Journal of the Association, we referred with pleasure to the organisation of a vacation course in Geography, last summer, by the Travancore Educational Department. Will the Director of Public Instruction, Travancore now follow it up by opening a Geography Department in the Training College, Trivandrum and for the Intermediate in either the Arts or the Science College ?

* * *

The Secretary would request Principals of Colleges to consider seriously the imperative need for introducing Geography as an optional subject in the Intermediate. It does not involve much additional expenditure as has been pointed out in the last volume of the Journal and the cost of equipping a geography laboratory can be spread over two or three years without in any way affecting

efficiency. It will help to raise the status of geography in high schools; and will provide, in the Intermediate stage, a subject which will, as it were, serve as a foundation subject for, say, Geology or Economics in the B.A. and Honours courses of study. Will the Principal of Madras Colleges, private and government give the lead in this direction ?

* * *

It is a matter for congratulation that 'the earlier and more rational 1929 S. S. L. C. Scheme' will be continued for another year. The syllabus in A Group Geography has been lightened considerably to suit the 'transitory' conditions. As suggested by us in an earlier issue the changes made in it have been confined to a minimum without in anyway modifying the basic principles underlying that syllabus. The modified syllabus is published elsewhere in this number.

* * *

It was pointed out in the last issue of the Journal that the *Syllabus in Geography for Forms I to III* is understood to be in the melting pot; and that a syllabus, drafted on modern lines, is shortly expected to be issued by the Educational Department, Madras. The new syllabus has not so far been published and the reason for this delay is not known. It will be very helpful if the Department of Education will place the new syllabus in the hands of the teachers at an early date so that the necessary adjustment to the changing conditions may be made by the teachers as well as the publishers. A qualified staff and a suitable text book are absolute necessities if the objects, to achieve which the new scheme is introduced, are to be realized.

* * *

The Association has now a Standing Committee of expert teachers of Geography who handle the subject from the very lowest standards of the Elementary school to the University stage. The Standing Committee will be pleased to answer any reference from members regarding books, equipment, methods of teaching, qualifications of staff etc. The Secretary requests all members to consult the Standing Committee on these matters to improve the conditions of teaching Geography.

* * *

The compulsory study of the one-inch map of the Home Reigion of the School is included in the Geography syllabus for Form IV according to the 1934 scheme. In any revision of the middle school syllabus in Geography the necessity for introducing the pupils to

these maps is likely to be stressed. In reply to an application made by the Secretary on a resolution of the Madras Geographical Association the Assistant Surveyor General, Calcutta in *his letter* 4519/991—*A dated* 13-11-34 has consented to give single copies of each of the one-inch and other maps of the Survey of India at half rates to *educational institutions.* 'Further copies required by the institutions should be supplied at full rates'. Heads of institutions or teachers of Geography are requested to take advantage of this concession. As they may not know the code number for the one-inch map of their school area they are invited to write to the Secretary of the Association who will be glad to supply them with the necessary information.

Select Contents from other Journals

The Geographical Journal: May and June, 1935.

Nanda Devi and the Ganges Watershed.—By Eric Shipton.

The Names of countries used by other Countries.—By the Librarian of the R. G. S. assisted by the Secretary of the Permanent Committee on Geographical Names.

Geography: June, 1935.

A Town Survey by School Children.—By L. R. Wood.

Nottingham (A Study in Urban Geography).—By K. C. Edwards.

The Journal of the Manchester Geographical Society: 1934-35.

Seasonal Movements of Sheep in Wales—By Elwyn Davies (Manchester University).

The Geographical Basis of the Irish Linen Industry.—By H. W. Ogden.

Geographical Review: April, 1935.

Geography and National Land Planning.—By W. L. G. Joerg (Editor, Research Publications of the American Geographical Society).

Coffee Plantations of Brazil.—By Dr. R. S. Platt (University of Chicago).

The Evolution of Land Utilization in Lebanon, New—Hampshire.—By E. N. Torbert.

Journal of Geography: November, 1934.

Geography Laboratory Work in the Teachers' College.—By G. S. Gibson.

The Scottish Geographical Magazine: May, 1935.

The Nowy Targ Basin: The Morphological Background to its Human Geography.—By Alice Garnett. (Sheffield University).

Academic Geography in the Seventeenth and Eighteenth Centuries.—By J. N. L. Baker., (Oxford University).

The Himalayan Journal: 1935.

Nanda Devi and the Sources of the Ganges.—By H. W. Tilman.

The Scientific Work of the German Himalayan Expedition to Nanga Prabat in 1934.—By Prof. R. Finsterwalder, Dr. Walter Raechl, and Dr. Peter Misch.

The Problem of Kangchanjunga.—By F. S. Smythe.

The Forests of Tibet.—By Captain F. Kingdon Ward.

The Geography and Geology of the Himalaya and Tibet.—By Lieut. Col. Kenneth Mason (Editor, The Himalayan Journal).

Indian Culture: January and April, 1935.

Earthquakes in India.—By A. F. M. Abdul Ali;

Geographical Data of the Dekkan and South India as gathered from the Ramayana.—By V. R. Ramachandra Dikshitar (Madras University).

The Indian Historical Quarterly: Vol. X.

Studies in Ancient Geography.—By H. V. Trivedi.

Indian Journal of Economics: April, 1935.

Population and Production (1920-31).—By Dr. P. J. Thomas (Madras University).

Reviews.

Short Matriculation Geography: By Herbert Pickles (Oxford University Press).

This is a text book prepared in accordance with the syllabus prescribed for the Bombay Matriculation Examination. The treatment is fairly simple. The influence of Geographical factors upon human life and activities is emphasised wherever possible.

The book consists of two parts. In Part I the mathematical and physical basis of Geography receive adequate attention. In the other five chapters of this part the reader is taken through a study of the World as a whole, its natural Vegetation and animal life, products and minerals, occupations and industries. A chapter on 'Trade Routes by Land, Sea and Air' rounds off this part of the book. Part II deals with Indian Empire in detail.

Suggestive questions at the end of every chapter, short though useful index, and a large number of sketch maps, diagrams and representative pictures enhance the value of the book. The get up is neat and attractive.

India and World Studies: By L. Dudley Stamp. (Longmans Green and Co).

As the author himself points out in his preface "this book has been specially written to meet the requirements of the syllabus in Geography for Form IV of the Madras Secondary School Leaving Certificate, 1934 Scheme"; but unfortunately that scheme has been kept in abeyance. Still it is a good, up to date reference book.

It is excellently written in a direct and easy style that is characteristic of the author. A few short type questions and useful exercises are given at the end of each chapter ; and the Volume is illustrated copiously with sketches, diagrams, maps and pictures. The get-up leaves nothing to be desired.

The Rational Geographical Exercise Books (Telugu: Primer for V Class, Book I for Form I: P. Surya Narayana (Ram Mohan Press, Rajahmundry).

The general complaint with regard to the teaching of Geography in South Indian Schools has been that the reformed methods

of teaching Geography have not yet filtered down to the middle and lower school classes. The books under review attempt to remove this defect partly. Map work is emphasised at every stage; and by means of questions and exercises the essential features of every topic taken for treatment are fully brought out. Clear and bold printing enhances the value of the books for young children.

The Geography of Kurnool Taluk (*Telugu*): By Y. Venkatadri Rao (Bala Sarasvati Book Depot, Kurnool).

The book is divided into two parts, the first of which deals with 'some fundamental notions of physical geography' and the second attempts 'a descriptive geography of the taluk with a brief historical account of Kurnool town'. It is not as psychological and descriptive in treatment as one would wish in a book of this kind; but the style is simple and the book is fairly well illustrated with pictures and maps. Questions at the end of each chapter help to recapitulate the essential points.

Boys Own Paper. Vol 1 Numbers 1, 2 and 3: (Monthly; Annual Subscription, one Rupee; Published by M. K. Rangachari, 232, Wall Tax Road, Park Town, Madras.).

The aim of the journal appears to be to help in releasing the 'latent abilities of young pupils', to make them see "things around them" in proper perspective. There are many short and interesting articles. The fine paper, the bold print and the nice get up have made the Journal attractive.

Books and Journals Received.

BOOKS.

Short Matriculation Geography: By Herbert Pickles (Oxford University Press).

India and World Studies: By L. Dudley Stamp. (Longmans Green and Co.).

The Rational Geographical Exercise Books: *Primer and Book* 1: (Telugu) By P. Suryanarayana (Ram Mohun Press, Rajahmundry).

The Geography of Kurnool Taluq (Telugu): By Y. Venkatadri Rao (Balasarasvati Book Depot, Kurnool).

JOURNALS—(*Foreign*).

The Geographical Journal: April, May, June and July, 1935.

Geography: June, 1935.

The Journal of the Manchester Geographical Society: Jubilee Volume, 1934-35.

The Scottish Geographical Magazine: May, 1935.

Geographical Review: April, 1935.

Royal Geographical Society of Australasia, Proceedings of the South Australian Branch: 1933-34.

JOURNALS—(*Indian*).

Indian Culture: April, 1935.

Indian Journal of Economics: Conference Number: April, 1935.

Journal of the Andhra Historical Research Society: July 1934.

Kalaimagal: May and June, 1935.

The South Indian Teacher: April, May and June, 1935.

The Indian Educator: April and May, 1935.

Macmillan's Educational Bulletin: May, 1935.

Our Home Magazine: May, 1935.

The Educational Review: April, May, June and July, 1935.

Educational India: April, May and June, 1935.

The Himalayan Journal: Vol VII, 1935.

The Madras Geographical Association

SUMMER SCHOOL OF GEOGRAPHY, APRIL 1935.

The Secretary of the Association has the honour to present the following Report to the Working Council regarding the organisation and conduct of the Summer School of Geography in April 1935 :—

In accordance with the Resolution of the Working Council on 26th January 1935, the Secretary prepared a Prospectus of the Summer School, which was sent to all the Headmasters in the Presidency. 37 teachers were selected, including 3 ladies; 12 of whom work in the high school, and the remaining are middle school teachers. To suit the convenience of some of the students of the secondary section of the Teachers' College, who joined the course, the classes had to be held from 1 to 6 p.m. with an interval for tea of a half-hour before the last period.

The scheme of work was as follows :—

(a) *The Pedagogy of Geography (including Syllabuses).*—By Mr. N. Subrahmanyam,
(b) *Surveying.*—By Mr. George Kuriyan,
(c) *Map-Work.*—By Mr. B. M. Thirunarayanan,
(d) *Diagrammatic Methods.*—By Mr. S. Balakrishna Iyer,
(e) *Mathematical Geography.*—By Mr. S. Muthukrishna Iyer,
(f) *Land Forms.*—By Mr. T. Sankara Singh,
(g) *Climatology.*—By Mr. G. Narayanaswami,

At 10 A.M. on Monday the 8th April 1935 Mr. Herbert Champion, M.A., Director of Public Instruction, Madras opened the Summer School; and the work went on steadily for three weeks. Two excursions were conducted during the period, one to the Pallavaram Hill and the other to Ennore Backwaters.

The total collection of fees from the 37 teachers that attended the course was Rs. 370 at Rs. 10 each. Out of this amount about Rs. 70 have been expended on travelling and carriage allowance of lecturers and sundry contingent expenses, which will be audited along with the Quarterly Accounts of the Association. The net balance of about 300 will be carried to the Association Fund.

The thanks of the Association are due to the Lecturers for their honorary work in the Summer School and to the Director of Public Instruction, Madras and the Principal, Teachers' College, Saidapet for allowing the classes to be held in the Geography Department of the Teachers' College and for permitting the officers in the Department to work in the Summer School.

Madras (Sd.) N. SUBRAHMANYAM.
26-4-35. *Secretary.*

Summer School of Geography

PROSPECTUS.

It is proposed to run under the auspices of the Madras Geographical Association a Summer School of Geography in the Geography Department of the Teachers' College, Saidapet, from Monday the 8th April to Saturday the 27th April, 1935. It is primarily intended to give training in Practical Geography to teachers of Geography in Secondary Schools.

The Summer School undertakes to provide for the teacher who has already had grounding in Geography work the training which would normally require two terms' work, in the course of a short period, by means of intensive effort along a concentrated course of studies, judiciously chosen for their value and importance from the point of view of the teacher. The course will consist mainly of practical work, field work and excursions, and will present the salient point, in such essential matters as map-making, map-reading and map-correlations, the study of land forms, climate and weather, use of graphic method and statistics, and construction of diagrams, models and appliances. A few general lectures, illustrative of geographic method and view-point, will also be delivered.

It is expected that Headmasters and Managements will, in the interests of efficiency of Geography teaching in their institutions, provide all the necessary facilities for their Geography teachers to come to Madras and undergo training in the Summer School. The number proposed to be trained is 60.

A fee of Rs. 10 will be charged for the entire course. This amount should be remitted to the Secretary, after receipt of the intimation of selection, so as to reach him not later than the 30th March 1935. Those whose fees are not received by that date cannot have their seats guaranteed.

Lodging and Boarding for those that require it will be arranged in the Teachers' College, Saidapet, and the probable expenses will be Rs. 15 for the whole period, payable in advance. Those wishing to stay in the Hostel will remit this amount to the

Secretary. Special arrangements will be made for accommodating lady teachers.

Applications are invited, and the applicants, such as are selected, will be furnished with other details regarding the course. Applications should be addressed to :—

' The SECRETARY,
The Madras Geographical Association,
Gopalapuram, Cathedral Post, Madras,"

so as to reach him not later than the 22nd March, 1935.

Madras, N. SUBRAHMANYAM,
11th March, 1935. *Secretary.*

Opening Function 8-4-35.

In requesting Mr. Herbert Champion, Director of Public Instruction, Madras to open the summer school, Mr. N. Subrahmania Aiyar, Professor of Geography, Teachers' College, Saidapet, and Secretary of the Madras Geographical Association said that this was the seventh summer school run by the Association. The aim of the summer school was to prepare a body of fully qualified teachers for the high schools. The summer school course would comprise mathematical geography, physical basis, map work, etc.

Declaring open the summer school of Geography, Mr. H. Champion said that he was struck by the practical character of the school which had eschewed all idealistic teaching. He felt sure that the pupils of the summer school would leave the course with the feeling that the money, time and energy which they had spent there were all well spent. He felt sorry that educationists in general and teachers in particular had not realised what an excellent and efficient organisation the Madras Geographical Association was. He felt sure that the 'Madras Geographical Journal' the organ of the Madras Geographical Association could face comparison with any similar journal of the west. He had no doubt that the Madras Geographical Association was a live energetic and progressive association and he attributed all that success to the selfless devotion of Mr. N. Subrahmania Aiyar to the cause of Geography. One would hear less about the defective nature of secondary and other stages of education if all school subjects had their own Association and journals like the Geographical Association. He wished the summer school all success.

With a vote of thanks to the chair proposed by Mr. S. Muthukrishna Aiyar the function came to a close.

List of Teachers who attended the Summer School of Geography in April 1935.

A. Graduate Teachers.

No.	Name.	Qualifications.	Address.	Remarks.
1.	Mr. Mohammad Ali Riza Khan	B.A., L.T.	Hyderabad	Deputed
2.	Mrs. S. Dharmambal	M.A., L.T.	Madras	Deputed
3.	Mr. Hashmatullah Ahrari	M.A.	Warangal	
4.	Mr. K. A. Narayanan	B.A., L.T.	Pattamadai	Deputed
5.	Mr. K. Nilakanta Rao	B.A., B.Ed.	Kurnool	Deputed
6.	Mrs. D. Samuel	B.A., L.T.	Madras	Deputed
7.	Mr. S. Srinivasa Iyer	B.A., L.T.	Kumbakonam	
8.	Mr. T. V. Swaminathan	B.A., L.T.	Kumbakonam	
9.	Mr. Waman Rao	M.A.	Hyderabad	
10.	Mr. K. Krishnamachari	B.A.	Madras	
11.	Mr. S. Lakshmi Narasimha Rao	B.A.	Veeravasaram	

B. Under-Graduate Teachers.

No.	Name.	Qualifications.	Address.	Remarks.
12.	Mr. G. C. Sundara Raj	Intermediate	Marikuppam, Mysore State	
13.	Mr. M. N. Ananta Narayanan	S.S.L.C.	Madras	
14.	Mr. P. T. Balakrishnan	Do.	Do.	
15.	Mr. K. Bhupathy	Do. Vidwan entrance	Walajabad	
16.	Miss J. Christian	Inter. Trained	Madras	
17.	Mr. R. Dharmalingam	S.S.L.C.	Do.	
18.	Mr. D. V. Doraiswami Rao	S.S.L.C.	Do.	
19.	Mr. K. K. Ekambaranathan	S.S.L.C. Trained	Conjeevaram	
20.	Mr. N. B. Hanumantham	Inter Trained	Nattarampalli (N. A. Dt.)	
21.	Mr. R. Harikuppam	S.S.L.C.	Madras	
22.	Mr. T. Kanniah Naidu	Do.	Do.	
23.	Mr. P. K. Krishnamurthi	Do.	Do.	
24.	Mr. K. Muthuvelayudam	Inter Studied	Do.	
25.	Mr. V. Nagarajan	Intermediate	Do.	
26.	Mr. K. Purushottaman	S.S.L.C.	Do.	
27.	Mr. S. Rajaram	Do.	Do.	
28.	Mr. N. Ramachandran	Do.	Do.	
29.	Mr. T. A. Sivaramasubramaniyan	B.A. Fail Sec. Trained	Do.	
30.	Mr. M. Srinivasa Viraraghavan	S.S.L.C.	Do.	
31.	Mr. V. Subudhinathan	Do.	Do.	
32.	Mr. A. K. Swaminathan	Do.	Do.	
33.	Mr. A. Theagaraj	Do.	Do.	
34.	Mr. K. Thiruvengada Naicker	Do.	Do.	
35.	Mr. O. Veerasami Mudaliar	S.S.L.C. Trained	Elathagiri (Salem Dt.)	
36.	Mr. T. Venkatavaradan	S.S.L.C.	Madras	
37.	Mr. V. Venugopala Pillai	S.S.L.C. Trained	Do.	

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